Vol. XLVIII AUGUST 9th, 1945

FLIGHT

and

AIRCRAFT ENGINEER

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FLYERS DOWN IN MINEFIELD

Rescue Launches Save 20

AN R.A.F. high-speed launch plunged into a Channel minefield in heavy seas to reach the crews of two "ditched" Flying Fortresses and came off after two hours in the thick of mines with 19 rescued men.

"We were on patrol," said Flying Officer Lockwood, "when we had a signal to proceed to a crashed airplane about 17 miles away in the middle of the minefield. We were on the spot within 40 minutes. The seas had thrown the Americans about, and the wind had torn their dinghies apart, but they were all right. We had got the ten of them on board when a Spitfire signalled that there were other dinghies some 4½ miles away, at a point still strewn with mines. We soon found the dinghies, taking four men out of one and five out of another."

FROM "THE EVENING STANDARD" 31 10 '44

The development and construction of the R.A.F. high Speed Rescue Launches is another of the achievements of

THE BRITISH POWER BOAT COMPANY LTD.

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648E

FLIGHT
and
AIRCRAFT ENGINEER

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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The Outlook

The Auxiliary Air Force

IT has been announced that the squadrons of the Auxiliary Air Force are to be withdrawn from active service with the R.A.F. and sent back to the cities and counties from which they take their name, so that they may lose no time in building up again the local connections which formed the basis of their composition before the outbreak of war.

As they exist now, the A.A.F. squadrons probably still retain a proportion of their original ground crews, but very few of the original pilots. Since the mobilisation of the R.A.F. for war, the Auxiliary squadrons have been merged in the whole of the national air effort, and vacancies in the ranks of the pilots were filled by regulars of the R.A.F., by men of the Volunteer Reserve, and by Allies, just as occasion served. In 1939 the letter A on the lapels of the tunic indicated an amateur as distinct from a professional—and in every walk of life the professional plumes himself as being a better man than the amateur. But by 1945 that letter A indicated a man with more experience than the bulk of the Air Force, and no one entitled to wear it felt any sense of inferiority. It became a badge of pride.

All the same, the original Auxiliaries, the " week-end pilots," were a grand crowd, and paid their way handsomely. The first German air raid on this country was made in October, 1939, on the fleet in the Firth of Forth. It was met and completely defeated by the Spitfires of Nos. 602 (City of Glasgow) and 603 (City of Edinburgh) Squadrons. Since then the country has owed much to the Auxiliaries. Among other things we may recall that at one time No. 604 (County of Middlesex) Squadron was outstanding among our night-fighters, and that the late Air Commodore Sir Nigel Norman (once a C.O. of No. 601 County of London Squadron) was in charge of the air side of the 1st Airborne Division.

Auxiliary Squadrons cost the taxpayer very little, and they pay handsome dividends. Even in time of peace their standards of efficiency are extraordinarily high, and the flying of their pilots has never fallen noticeably below that of the regular fighting squadrons. The explanation doubtless is that British youth likes flying, and considers time put in with an Auxiliary squadron not as a grind and a distasteful though patriotic duty, but as a favourite recreation. There can be little doubt that those young men who join these squadrons in the future will be as good as the glorious company which plunged into the Battle of Britain in 1940.

A Disturbing Suggestion

THE Air Ministry notice regarding the return home of the Auxiliary squadrons contains one paragraph which is rather disturbing. It announces that it may not be possible to provide the squadrons with combat aircraft immediately on their return home. For the present the *esprit de corps* and the enthusiasm of the squadrons will be sustained by club activities, flying light aircraft, and ground instruction.

Club activities is an expression which suggests cocktail parties, dances, and suchlike. Everybody who comes safely back from a war wishes to relax on such lines for a while; but how such functions will sustain *esprit de corps* and enthusiasm is not clear. Ground instruction is all very well, and all ranks of an Air Force must undergo the process; but it is the duller side of training, and is not likely to have an inspiriting effect. As for flying Tiger Moths, that will hardly make a strong appeal to pilots who for years have handled operational aircraft. There must be lots and lots of combat aircraft now which are surplus to the requirements of the war against Japan, and they ought to be made available for the Auxiliary squadrons. Hurricanes are no longer first-line fighters, but they would make a satisfying substi-

tute for Spitfires and Tempests if all the latter must be retained for the use of squadrons in the Far East and the Air Force in Europe.

We recognise that there must be great changes in the personnel of the Auxiliary squadrons. They have to regain their local connections, which have been lost during the war. Many, perhaps most, of the V.R. pilots now in the squadrons will be transferred or demobilised, and their places will have to be filled by volunteers from the locality. These must be trained, and we cannot say yet whether that training will be undertaken by the R.A.F. schools or by the squadrons. Tiger Moths will certainly be a feature of the squadrons' activities for some time to come; but the sooner they all get back on to combat aircraft the better.

Private Enterprise in Aircraft Production

MR. T. O. M. SOPWITH, the famous pioneer in British flying, speaking as chairman of the Hawker-Siddeley group at the recent general meeting of the company, said: "It was private enterprise which laid the foundations of the aircraft industry; it was private enterprise which provided the technical and productive organisation capable of dealing so successfully with an industrial expansion of unprecedented magnitude."

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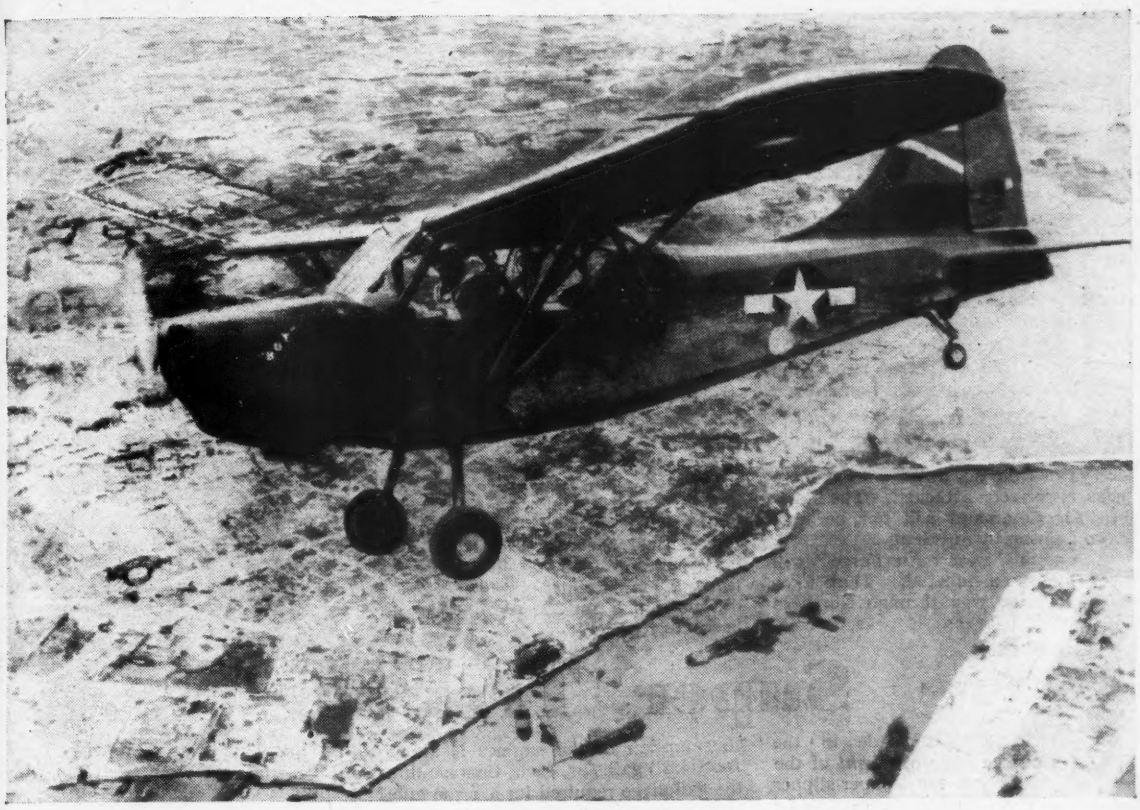
In this connection we may recall that Sir Frank Spriggs, of the same group, took upon himself the responsibility of ordering 1,000 Hurricanes to be manufactured before the Government had passed an order for them. It was an act of great enterprise and initiative, and we may now ask with wonder where we should have been in the Battle of Britain if those Hurricanes had not been ready to plunge into the fray. The thought of what might have happened to us if Sir Frank had waited for Government orders is enough to appal. The German plans for the treatment of Britain when conquered have been discovered and their contents published.

The other side of the picture is provided by the evidence of General Weygand in the Pétain trial in Paris. The General said that at the outbreak of war the strength of *L'Armée de l'air* was 450 fighters and 60 bombers, of which about half were of modern types. Actually the most successful fighter in the hands of the French was an American Curtiss. Not very long before the war broke out, the French Government had nationalised practically the whole of the French aircraft industry. When one recalls that in the early 1920s, after the *reductio ad absurdum* of the Royal Air Force, France was the most powerful nation in the air, her plight in 1939 appears especially pitiable.

France paid bitterly for her weakness in the air. The streams of refugees who choked the roads in front of the advancing German hordes were pitilessly machine-gunned by the *Luftwaffe*, and there was no adequate protection from Allied fighters. The Stukas and tanks of the enemy broke up the strong positions on which the French Army tried to stand, although the Stuka was a machine which could easily be shot down by any modern fighter. The B.E.F., too, was short of fighters; but, thanks to the supply of Hurricanes ordered by private enterprise, Britain survived as the base for Allied victory.

THE GREATEST AUXILIARY OF ALL: Winston S. Churchill, Hon. Air Commodore of No. 615 (County of Surrey) Squadron, Auxiliary Air Force, who, coincident with the A.A.F. being withdrawn from active service, also stands down from the office of Prime Minister.



DOING HIS PREP.: A U.S. Marine Grasshopper, with a photographer on board, taking pictures of the next day's artillery and aerial bombardment targets.

WAR in the AIR

Destruction of Japanese Warships and Aircraft : Monsoon Flying in Burma

IT is not surprising that the call from Potsdam for the Japanese to surrender has produced no results or that the Japanese appeal to the United States to be merciful has evoked no response. The first attempts at peace feelers seldom do produce results, and all Asiatics love bargaining. Whether further moves in the same direction will be made remains to be seen.

The Japanese Prime Minister, Admiral Suzuki, has boasted that their aircraft production was much above what had been expected; but added that had this production taken place a bit earlier "we would have avoided causing much worry to various circles." Those circles are obviously not the fleets and Air Forces of the Allies, which have continued to cut down the output of the enemy's aircraft production. It is not out of the way for the totals of enemy aircraft destroyed in a day to run into three figures, and it is notable that nearly all are destroyed on the ground. The American 3rd Fleet, with its British component, has continued to steam along the coasts of Japan, shelling and bombing at its leisure. By last weekend at least two Japanese battleships had been spotted from the air in a crippled condition, one beached and the other sunk. By now the once formidable Japanese Navy may be written off as a serious fighting force. It has gone down without glory. Germany may take pride in the last hours of the *Bismarck*, which went down with colours flying, after firing her guns until they were all silenced by those of H.M.S. *King George V.* and the *Renown*. The *Haruna* and the *Ise* may have kept their colours flying, but none of their guns were fired in their last hours, except perhaps the A.A. batteries.

The American announcement that 11 Japanese towns were next to be bombed was quickly made good. Six of them met their fate two days after the warning. For the future the Japanese will have every reason to believe what the Americans say.

The heavy land-based bombers do not always take off from Okinawa. It would be a long business to move all the bases to that island. They sometimes start from Guam and refuel at another island on the way.

It is good news that the Chinese have taken one of the airfields at Kweilin, the capital of Kwangsi province. That is still a good long way from Hong Kong, but it is on the way. It is absolutely necessary for us British to recapture Hong Kong for every reason. Not least among them is the fact that many British prisoners and civilian internees are held there, and the Japanese are not remarkable for the kindness with which they treat enemy nationals in their hands. Fortunately most of the British women in Hong Kong were evacuated to Australia in good time.

All last week the Japanese in Burma have been striving to get to the Sitang river and across it. During the week it is estimated that a good half of the whole force had been killed by the British and Indian infantry. The number of prisoners taken was small; for one does not expect to take many

WAR IN THE AIR

Japanese prisoners. It has been impossible to count the number of Japanese dead who have fallen victims to the artillery and aircraft. The latter had a very uncomfortable time. Their airstrips in the *padi* fields were converted by the monsoon into mud strips. The strikes have mostly been carried out by Spitfires and Thunderbolts, and the latter had to fly 200 miles from their base to the battle zone. Sometimes the cloud ceiling has only been 100 feet high; but the attacks have been pressed home, even when rain obscured the windscreens and made it hard to see the targets. On occasions targets not more than 200 yards from our own front line have been effectively attacked. The Eastern Air Command will not be kept from fighting by anything.

The term "Desert Air Force" will always be remembered. That force fought all the way through Northern Africa; but when it was operating over the mountains of the Apennines it was still known by the proud title of the Desert Air Force. Now we hear of a body called the Jungle Air Force in Burma. It has been operating with the newly formed 12th Army under Lieut. Gen. Sir Montague Stopford, and he has sent a message to the J.A.F. in which he praises their keenness and determination to get through in flying conditions which must have been most difficult.

THE SOFTENING-UP PROCESS: The town of Brunei after an attack by R.A.A.F. Beaufighters and Liberators during the landings by Australian troops in British North Borneo.

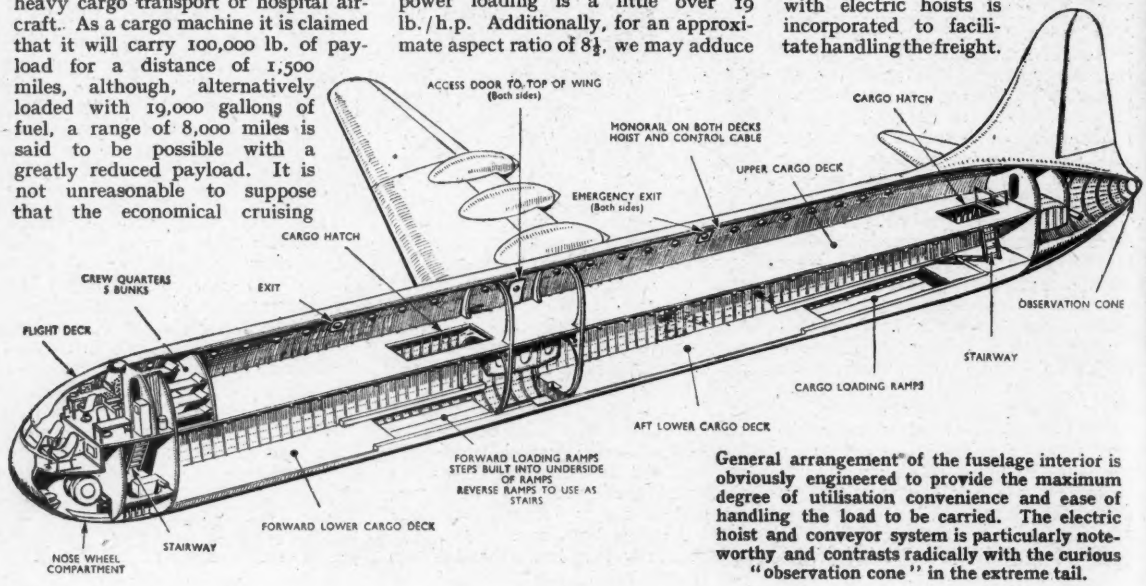
Super Trooper

MENTION was made in the April 12 issue of *Flight* of the giant 160-ton super-clipper 204-passenger aircraft ordered by Pan American World Airways from Consolidated-Vultee. In the July 12th issue we further mentioned that a cargo version of this aircraft was under construction by the same company for the U.S. Army Air Transport Command.

The latter version is, it is understood, primarily intended for use as a troop carrier, although its capacity very well fits it for employment as a heavy cargo transport or hospital aircraft. As a cargo machine it is claimed that it will carry 100,000 lb. of payload for a distance of 1,500 miles, although, alternatively loaded with 19,000 gallons of fuel, a range of 8,000 miles is said to be possible with a greatly reduced payload. It is not unreasonable to suppose that the economical cruising consumption of the engines is about 100 (U.S.) gall./hr. each, thus making the gallonage required for a 1,500-mile trip at 310 m.p.h. about 3,000. The fuel weight would be approximately 18,000 lb., and, on the same count, 19,000 gall. would weigh 114,000 lb., so that we are thus led to assume that for a range of 8,000 miles at similar conditions the payload would be reduced from 100,000 lb. to 4,000 lb.

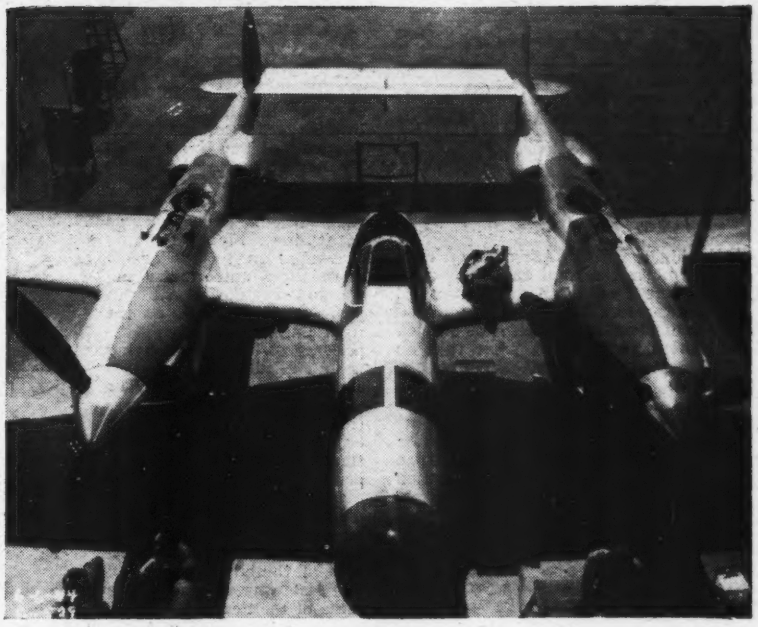
Six engines driving pusher propellers power the aircraft and, assuming an output of 2,800 h.p./engine, the power loading is a little over 19 lb./h.p. Additionally, for an approximate aspect ratio of 8½, we may adduce that the wing area is roughly 6,220 sq. ft., and, therefore, that the wing loading is something over 51 lb./sq. ft.

The fuselage is double-decked and of "double-bubble" cross-section, the waist being at upper-deck level. Similarly to the passenger liner, the transport version is said to have a pressurised fuselage for operation up to 30,000ft. The latter undertaking appears to be distinctly ambitious. As shown in the accompanying illustration, the fuselage is equipped with loading ramps-cum-stairs, and an overhead monorail transporter system with electric hoists is incorporated to facilitate handling the freight.



General arrangement of the fuselage interior is obviously engineered to provide the maximum degree of utilisation convenience and ease of handling the load to be carried. The electric hoist and conveyor system is particularly noteworthy and contrasts radically with the curious "observation cone" in the extreme tail.

HERE AND THERE



LIGHTNING PATHFINDER : The latest modification of the P-38. In the elongated metal and plastic nose are all the modern radar aids to precise navigation, and accommodation for an operator.

New Mustang

ACCORDING to Reuter, an improved version of the North American Mustang is now rolling off the production lines to join in the Pacific war. Known as the P-51H, it is powered by the latest Packard-built Rolls-Royce Merlin engine, said to produce more than 2,000 h.p.

Fillies Affiliated

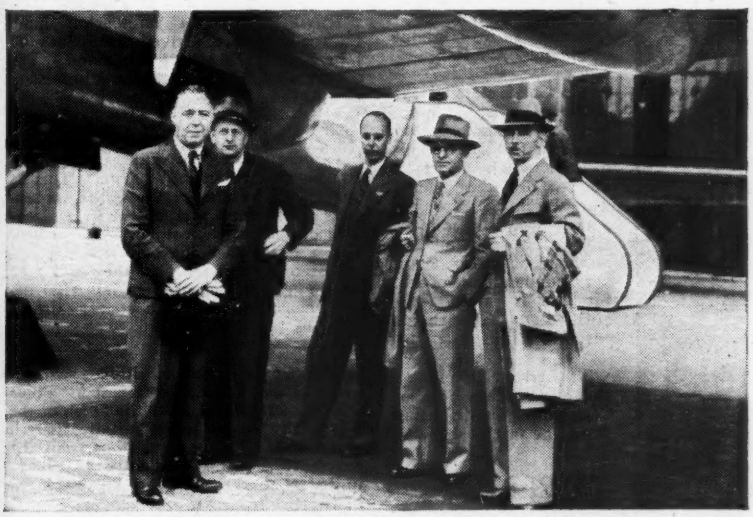
THE Air League of the British Empire announces that the Women's Junior Air Corps, whose chairman is Lady Leverhulme, has become affiliated with the League. The Corps retains its separate identity, but will share in the educational and other facilities of the League. The W.J.A.C. hopes to start gliding clubs for the cadets, who will also receive elementary instruction in flying.

Bristols in Car Industry

IT is announced that the Bristol Aeroplane Company, Limited, has recently acquired a substantial interest in A.F.N., Ltd., the well-known company which has been responsible for the long series of successful high-performance Frazer-Nash touring and sports cars. Two Bristol directors, Mr. G. S. M. White and Mr. W. R. Verdon Smith, have joined the board of A.F.N., Ltd. Col. H. J. Aldington remains managing director and will retain responsibility for design. His brothers, Messrs. D. A. and W. H. Aldington, also continue their association with the company. This extension of activity on the part of the Bristol Aeroplane Company was foreshadowed in the chairman's remarks at the recent annual general meeting.

New Home for I.Ae.Sc.

THE Institute of the Aeronautical Sciences, American equivalent of our Royal Aeronautical Society, has purchased the residence of the late Mr. E. J. Berwind at 2, East 64th Street, facing Central Park, in New York. The building, which has 35 rooms and two lifts, will be remodelled to provide for the extensive libraries and exhibits of the Institute. It is expected to be ready by the autumn, when the I.Ae.Sc. will transfer to it from its present address in Rockefeller Plaza.



POTENTIAL BUYERS : Commonwealth Air Transport representatives, in this country for the recent conferences, paid a visit to Avros to see the Tudor and other civil aircraft in production. (Left to right) Roy Chadwick (Avro's Chief Designer), Mr. Badenach (Australia), Mr. L. Brown (Australian National Airways), Col. G. S. Leverton (South African Airways) and Sir Frederick Tymms (Dir. Gen. of Civil Aviation, India).

After Seventeen Years

MR. F. W. BUGLASS has resigned his position as chief production engineer with Blackburn Aircraft, Ltd., Brough, East Yorks, and will take up an appointment as production engineer with Boulton Paul Aircraft, Ltd., Wolverhampton, early in August. Mr. Buglass has been with the Blackburn Company for seventeen years.

"Earthquakes" for Japs

BROADCASTING from Manila, General Kenney said that there will soon be more than 5,000 aircraft in the Far East Air Forces. As his command does not include the Superfortresses, nor the carrier-borne aircraft, it looks as if Nippon may soon regret its refusal to comply with the Allies' recent call to surrender. Or, as General Kenney put it: "The Japs don't like earthquakes; we don't like the Japs, and so we are going to give them earthquakes 24 hours a day until they quit!"

Super-Liberator

AMERICA has now revealed that the Super-Liberator, the B-32, is now in action against the Japs. On their first operational mission a flight of B-32s so successfully attacked a town in Formosa that there was little or no work left for the Liberators which followed. In size the B-32 is between the Liberator and the Superfortress, weighing approxi-

HERE AND THERE

mately twice as much as the former. It is powered by four Wright Cyclone engines of more than 2,000 h.p. each, and is said to cruise at 300 m.p.h. over very long distances.

Times Have Changed

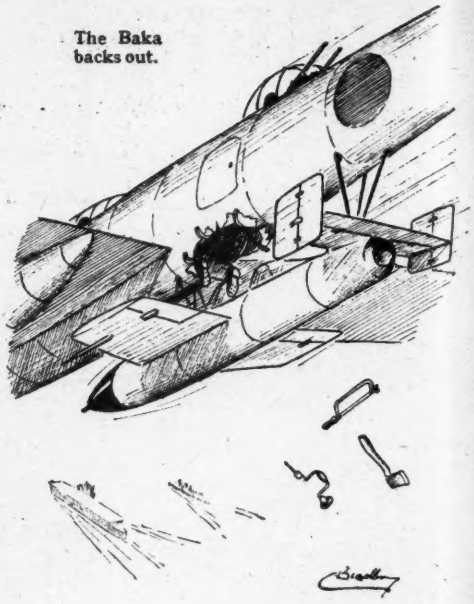
THE flight, with an American crew, of a Junkers 290 from Paris to Wright Field, where it will be thoroughly studied by American technicians, provides a welcome indication of a change of outlook since the 1914-18 war. After that an Allied mission to Germany committed the incredible folly of having a Zeppelin Staaken monoplane destroyed. That machine was a long way ahead of its time, and as it was in flying condition it could easily have been brought to France or England for examination and tests. Not that there is likely to be much to be learned from the Ju.290, but the principle which its flight represents is certainly right.

"Aussie" Mustangs in Action

THAT Australian-built Mustangs will soon be in action against the Japs was disclosed recently by the Australian Air Minister, Mr. Drakeford. They will be flown by R.A.A.F. pilots, and the first squadrons are being formed at Townsville, Queensland, which were formerly equipped with Kittyhawks. They will be used in operations in Borneo. The first Australian-built Mustang was tested at the Melbourne factory of the Commonwealth Aircraft Corporation, the tests being watched by the Director-General of Aircraft Production, Mr. Essington Lewis, and his Deputy Director-General, Mr. McVey.

Coningham's New Command

WHATEVER is in store for the R.A.F. in the way of reductions, the announcement that Air Marshal Sir Arthur Coningham is to succeed Air Marshal Sir Philip Babington on the latter's retirement in September as A.O.C.-in-C. Flying Training Command must be welcomed and is a guarantee that flying training of the R.A.F. in post-war days will be on the right lines. Sir Arthur's experience of operational flying is unrivalled for its duration and variety, and we may be sure that any shortcomings (they cannot be many) which he has discovered to be traceable to the training period will be eliminated. Moreover, Sir Arthur is an officer who has proved that he can take the long view, and he will not make the mistake of thinking in terms of the last war instead of in those of the next.



The Baka backs out.

News in Brief

Mr. Pearson Horder has been appointed Public Relations Officer to Dowty Equipment, Ltd., of Cheltenham.

* * *

Amid the landslide of airminded M.P.s who must now put "former" in front of their names, it is pleasant to record that Mr. E. L. Gandar Dower managed to get in for Caithness and Sutherland. He can be expected to be a thorn in the side of the Government where "chosen instruments," internationalised air companies and the like are concerned. He will not emulate the former Member's attempts at rhetoric, but he can be expected to talk good common sense about commercial aviation.

* * *

Air Chief Marshal Sir Arthur Harris, C.-in-C., Bomber Command, on his arrival at Recife, indicated that he will take no part in the Pacific war, which he considers a task for younger men. After his magnificent guidance of R.A.F. Bomber Command in Europe, Sir Arthur is certainly entitled to take things easy for a bit.

* * *

Sir Arthur expressed the view that Bomber Command's contribution would be in the shape of medium bombers, since the heavies were not suitable for operation from existing Far Eastern bases.

* * *

Engineers of the Glenn L. Martin Company have modified the Martin Mariner so that it can now be converted by Navy personnel from its ordinary duties as rescue aircraft into a lifeboat-dropper. The lifeboat is carried in the bomb racks, which have been modified for the purpose, and the lifeboat itself, 18ft. long by 6ft. beam, has been slightly streamlined so as to fair into the wing.

* * *

R.A.F. personnel numbering more than 2,000 have arrived in Sydney to join R.A.F. Transport Command. The majority will be posted for administrative duties.

* * *

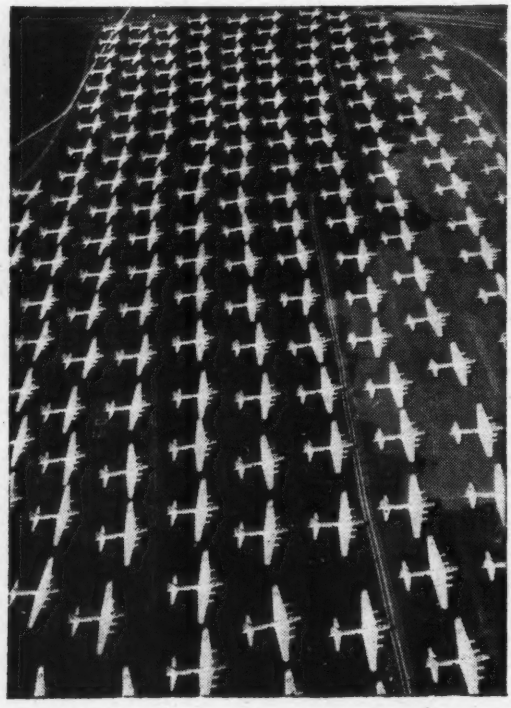
Fighter pilots of the Royal Air Force have been invited to volunteer for transfer to the Naval Air Arm. This is one of the results of the contemporaneous contraction of the R.A.F. and expansion of the Naval Air Arm, whose war is far from being over yet. It will be interesting to see how they will take to the heaving decks of carriers after being accustomed to nice steady airfield surfaces.

* * *

The Government of India has announced that the Royal Indian Air Force will be maintained, after the finish of the war with Japan, at an initial strength of not less than ten squadrons, plus the necessary training and other ancillary units required. The pre-war strength of the R.I A.F. was one squadron.

* * *

A University Officers' Training Corps has been established at Bangalore and Mysore. According to "Indian Aviation," an Indian Air Training Corps will start at the Maharaja's College.



TARGET FOR A SHOOT-UP: Flying Fortresses parked wing-tip to wing-tip at an American replacement depot near Munich. Probably these are now on their way to the Far East.

Old Timer Flies Again

Record Breaking Globe Trotter of Seventeen Years Ago Comes Out of Museum to Star in Movies

By GAVIN CASEY

FOR the past nine months mechanics at the Royal Australian Air Force Station in Canberra have been busy overhauling and repairing an old wooden monoplane. Their main task has been fitting its three 220 horse-power Wright Whirlwind engines, so that the machine could go on its trials—for it has not been aloft since July 18th, 1935.

With its total horse-power of 660 (less than that of most single-engined machines of 1944) under its wing span of 71ft. 8½in., the aircraft was a mammoth of the skies in its day, although, in its trials, it loitered far behind the swift aircraft of 1945 and looked small alongside modern bombers. But the " Old Bus " flew proudly all the same—as might be expected, for it is the Fokker F7 that blazed the Pacific trials so many modern aircraft now fly.

This machine is *The Southern Cross*, cheered by excited multitudes in America, Europe and Australia between 1928 and 1935. It is the instrument which was used by the greatest long-distance flyer of them all, Sir Charles Kingsford Smith, to plot new skyways and to prove the possibilities of air travel. Had it and its kind not had their adventurous, dangerous day, we could not have progressed so far beyond their limits.

Sir Charles Kingsford Smith says in his autobiography that he and *The Southern Cross* grew old together. Other men and other aircraft did great deeds and disappeared, but Smithy and *The Cross* stayed right in the forefront of world aviation for seven long years. Their perilous course across oceans and continents was followed by hundreds of thousands of radio listeners, and their triumphs were shared by three nations. They ended nine years ago.

Now, Columbia plans to put them on the screen in a movie written by Australian thriller ace Max Afford, produced by Australian Ken G. Hall, and acted by an all-Australian cast. The actual aircraft will play its part. But Smithy will not, for away back in 1935, on the first long-distance flight he attempted after he had handed *The Southern Cross* over to the Commonwealth Government to be preserved in the National Museum, he vanished off the coast of Burma, and was never heard of again.

The 20 men who have been reconditioning the big Fokker since last September looked forward to its trials with some apprehension. They are war-trained mechanics, who think in terms of thousands of horse-power, all-metal fuselages, retractable landing gear, and hundreds of miles an hour. But they are respectful to an aircraft which has proved itself, all the same.

" You'd think that a bit of wind would blow all that kite right out of the grip of those little engines," says a sergeant. " I have to remind myself of all she's done to make myself realise that she will really fly when we've finished the job."

If he thinks back, he has plenty of proof that she would fly. She has been around the world about its greatest circumference. She carried the Australian explorer Sir Hubert Wilkins over the Arctic before she became Smithy's machine. She took Sir Charles Kingsford Smith on the pioneer flight across the Pacific, around and across Australia, across the Atlantic, across the American continent, and over the treacherous Tasman sea between Australia and New Zealand several times. She can fly, all right! And so could the man who flew her.

Charles Kingsford Smith got into the A.I.F. in World War 1 on his 18th birthday, in 1915. From the Engineers he went to the Signallers, and on to the risky business of motor cycle despatch riding. Like many great aviation pioneers, he got his chance with the formation of the Royal Air Force. He flew, fought, shot down Germans, was wounded himself, and was an instructor by the time he was 21 years old, in 1918.

After World War

When the fighting ended, he became one of the young and fearless flyers who lived precariously in all sorts of ways. In battered old DH6 biplanes bought from the British Government, he barnstormed through England, offering joyrides and taxi flights to people mad enough to be interested in aviation. Then he went to the United States, and was in turn a stunt flyer in Hollywood and a " flying scarecrow " over Californian rice fields.

He came back to Australia in 1921, flew for the " Diggers' Aviation Company " and West Australian Airways, and was a working partner in a road transport company covering long routes in Western Australia. In the meanwhile, the Englishmen Alcock and Brown had flown the Atlantic for the first time, and Ross and Keith Smith had won the great £10,000 England-Australia air race in 28 days. Young Kingsford Smith felt that others were carrying out all his most cherished ambitions, and became impatient.

In 1927 he met Charles Ulm, a young flyer with similar ideas, and one of the greatest partnerships in flying history began. By then the Atlantic had been conquered. The long hazardous route from England to Australia had been flown. Of the links between English-speaking lands, only the Pacific remained to be spanned by air. Kingsford Smith and Ulm decided that they would attempt it.

That was an ambitious decision, for who were Kingsford Smith and Ulm in 1927? So far as anyone knew, they were

OLD TIMER FLIES AGAIN

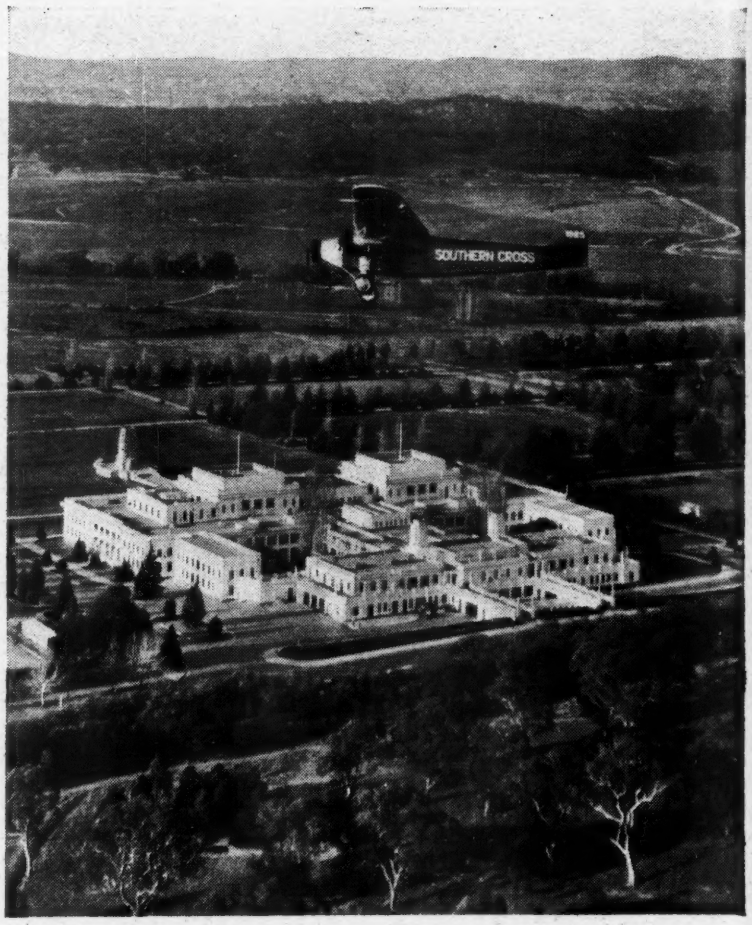
just run-of-the-line airway pilots of the sort that could be hired anywhere for a few pounds a week. Some smaller venture that would make the headlines was necessary before anyone would take their big ambition seriously. So the pair climbed into their Bristol in June, 1927, and broke a local record by hurtling the 7,500 flying miles around Australia in 10 days 5 hours. After that they linked up with a third pilot, Keith Anderson, and set out for the United States.

Kingsford Smith and his partners landed in San Francisco on August 5th, 1927, to buy a machine and fly back to Australia. But they did not leave until nine months later, on May 31st, 1928. Financial and all other sorts of troubles besieged them, not least of them the result of the tragic Dole air race to Hawaii, when seven lives were lost, and support for aviation slumped in Western America.

They secured *The Southern Cross*, but it was not paid for and their hold on it was mighty uncertain. To raise funds, they made five attempts to break the German-held "sustained flight" record of 52 hours 22 minutes. On the fifth try they remained in the air for 50 hours 4 minutes, and were satisfied that it was impossible to get *The Southern Cross* off the ground on the available runways with a load of fuel capable of keeping her up any longer. In the five flights she had proved herself an ideal machine for the long-distance hops they contemplated over the Pacific. With a wing loading of 23.2 and power loading of 26.3, she had handled a composite load of 49.5, the heaviest ever lifted, and her engines had behaved magnificently. But what was the use of that, when it looked as if they would never be able to start on the big flight?

Their saviour was Capt. G. Allan Hancock, who bought *The Southern Cross* for them and advanced funds as well. Anderson had returned to Australia, but Smith and Ulm were more than ready. With C. C. Maidment, who had been Charles Lindbergh's mechanic, to tune their motors to perfection, they had no doubt of the ability of the machine or themselves.

The Southern Cross carried 1,298 gallons of fuel in all its tanks. Its engines reached 1,800 r.p.m. and gave 120 m.p.h. at full throttle. Cruising speed was 94 m.p.h. at 1,600 revs, with fuel consumption of 11 gallons an hour. All that remained was to fly and navigate it over thousands of miles of hungry sea, through whatever storms and hours of darkness intervened.



OVER CANBERRA: Australia's most famous aircraft, *The Southern Cross*, flies over the nation's legislative headquarters—the Commonwealth Parliament House in Canberra—during its test flight. Pilots of escort planes with camera-men aboard found it hard to keep their speed down during run although *The Southern Cross* made up to 100 miles an hour.

Oakland to Brisbane

Kingsford Smith and Ulm, with two Americans, Capt. Harry Lyon and James Warner, as navigator and radio operator, took off from Oakland airport on May 31st, 1928. On the morning of June 9th they arrived in Brisbane, with 7,938 miles of ocean behind them, and enthusiastic crowds waiting to welcome them in all Australian cities.

That flight, and the many which followed it, were as full of adventure as all long-distance flights were in 1928, and Sir Charles Kingsford Smith has told of them in detail, and with humour and observation, in his book, "My Flying Life." Here, their very number and variety leaves no space for detail.

The crew received cash and honours for their great effort. Total of money from an Australian Government grant and newspaper and other subscriptions was more than £20,000, and trophies included the American National Geographic Society's medal and the trophy of the *Federation Aeronatique Internationale*. Warner and Lyon returned to the United States, and Kingsford Smith carried on with other crews.

First, *The Southern Cross* made a non-stop dash of 2,090 miles across Australia. Then she was made ready for a comparatively short but extremely hazardous flight from Australia to New Zealand, over the Tasman Sea. "Doc" Maidment came to Australia to look after the engines, and both mechanical and flying skill were needed. The aircraft fought through storms over one of the wildest seas in the world, and Kingsford Smith was almost tragically trapped when ice, which also damaged an airscrew, jammed up the airspeed indicator, causing him to miscalculate and hurtle hundreds of feet towards the water before he realised what was wrong. The first flight across the Tasman was completed on September 11th, 1928, and then the machine was flown back to Australia.

Australian National Airways were formed by Smith and Ulm on their return, and they decided to fly *The Cross* to England, to buy aircraft. They left the southern part of Australia on March 31st, 1929, with the far north-west port of Wyndham scheduled as their first landing point. Unintentionally misleading directions pointed by mission natives on the ground caused them to become hopelessly lost, and they landed in swampy, wild country, unharmed, but so bogged and short of fuel that it was impossible to shift the machine.

It was not until April 18th that *The Southern Cross* was able to take to the air again, and intervening days were bitter ones for the stranded, foodless airmen. Several times they saw aircraft which did not see them despite the great size of the wing of *The Cross* and the fires which they kept burning. By the time they were located, by Capt. Leslie Holden in his DH6, they were starving to death. It was terrible country, and during the search for them, their former partner, Keith

Anderson and his mechanic, H. S. Hitchcock, were forced down in dry, uninhabited areas by engine trouble, and died of hunger and thirst.

Kingsford Smith and Ulm made a second start for England on June 25th, 1929, and this time flew the 10,000 miles in the record time of 12 days 18 hours, and made the first non-stop flight from Australia to Singapore. In Europe they met Fokker, who had designed the machine, and for whom Smith conceived a boundless admiration. The regard was mutual, for Fokker helped the flyers immensely with cash, as well as by reconditioning the aircraft completely in his factory.

To fly the Atlantic Smith chose a Dutch co-pilot, Evert Van Dyk, but his east to west crossing, like all which had preceded it, was not wholly successful. Compass trouble sent *The Southern Cross* far off its course, and a landing on Newfoundland was necessary. However, when they eventually arrived on Oakland municipal airfield, the great old aircraft had added circumnavigation of the globe to its other feats.

Smith returned to England by sea, to take delivery of the Avro sports biplane he had ordered and attack the two-year-old solo flight record for 15½ days from England to Australia held by the Australian pilot Bert Hinkler. He was as successful with the small aircraft as he had been with the big one, and covered the 10,000 miles in less than 10 days. A.N.A. then began its regular air service from the Australian mainland, Kingsford Smith making the first flight in *The Southern Cloud*. *The Southern Cross* went on to regular service and mail flying on various Australian runs.

Then the luck turned. *The Southern Cloud* was lost, and no trace of it or any of its crew or passengers has yet been found. Smithy and his associates made an air search that cost thousands of pounds, and almost crippled their finances. World-wide depression in the early 1930s crippled them altogether, and Australian National Airways virtually closed up. To earn a living, Kingsford Smith had to take the old *Southern Cross* barnstorming around Australia, offering joyrides to all and sundry. Neither let the other down, and they made money. But it was poor work for a man and aircraft after all they had done.

Christmas Postman

In emergency circumstances in 1931, he flew the *Southern Star* with Christmas mails from Australia to England in 13½ days and back in 11 days. But even by then there was no certain prosperity in flying. When Charles Kingsford Smith was knighted, in June, 1932, he was once more in the old *Southern Cross* earning a precarious living taking thrill-seekers for rides from country showgrounds all over Australia. Bestowal of a title on a "barnstormer" was deplored in some quarters, but the nation applauded, and only deplored the apparent lack of better work for such a man.

In 1932 Sir Charles Kingsford Smith met Capt. P. G. Taylor, who was to play a noteworthy part in his most amazing adventure, and in 1933 they teamed-up to take *The Southern Cross* over the Tasman again. For several months they exhibited the grand old aircraft and took joyriders up in her in the Dominion, but by October Smithy was back in Australia and once more in the cockpit of the Percival *Gull* in a record flight to England. He secured the solo record in 7 days 4 hours 43 minutes.

The great England-Australia air race, with which the Centenary of the State of Victoria was celebrated in 1934, was a great disappointment to Smithy. After the usual financial troubles he secured a magnificent aircraft for Taylor and himself to fly. It was the Lockheed Altair *Lady Southern Cross*, with which he immediately broke six cross-country records in Australia. But when he was ready to leave for England an engine-cowling cracked and, because there was no time for repairs, put him out of the running. Bitterly disappointed, he and Taylor flew the Altair to the United States for sale, and Kingsford Smith went back to taking people for 10s. rides in *The Southern Cross*.

The fine old monoplane made its last ocean flight in May, 1935. Smith and Taylor had fulfilled an ambition to inaugurate a regular airmail service across the Tasman from Australia to New Zealand, and at 12.25 a.m. they took off for the Dominion in the heavily laden machine. All went well until 7 a.m., when they were 650 miles from the Australian coast, and when only Smithy's quickness at the controls prevented utter disaster as a piece of the exhaust pipe of one engine fell off and was swept into the airscrew of the starboard engine, from which it removed a piece measuring 9 inches by 12 inches and weighing 15 ounces.

The Last Flight

Kingsford Smith cut the engine before it destroyed itself and probably the rest of the aircraft, turned around, and began to limp back towards the Australian coast on two engines. From then on the flight was a life-and-death struggle, with the machine often only ten feet above the sea, and its skipper holding out until the last possible moment before dumping the mails.

At full revs to keep flying, the other engines laboured hard and used more oil than normally from the tanks directly over them. At 8.55 a.m. the port engine started to knock as its oil supply decreased, and by 12.12 p.m. the crew estimated that it would keep only for a quarter of an hour. Frantic radio messages told the authorities the exact position of *The Southern Cross* so that searching craft could come out, and as the news went through public broadcasting networks thousands of listening Australians mentally bade farewell to Smithy.

But at 12.54 p.m. Capt. P. G. Taylor saved the aircraft and its crew by an act of sustained heroism which has rarely been equalled. While the aircraft plunged on, just above the crests of the waves, he climbed barefooted out along a narrow strut to the silent starboard engine and drained some oil from its tank into his thermos flask. Then he climbed through the cabin and out on to a similar strut to port, from which he could pour the vital liquid into the tank on that side. Six times he made this perilous journey, and on the last trip his thermos flask broke. "Bill Taylor is world's greatest hero," radio operator Jack Stannage wrote in his log, and transmitted to shore stations.

A few months ago, mechanics now working on the machine located a piece of Capt. Taylor's flask in the port oil tank. That wild flight ended the active life of *The Southern Cross*. A few weeks later the "Old Bus" was flown from Sydney to Canberra, where it was housed for nine years.

Five months later ended the life of the monoplane's pilot, Sir Charles Kingsford Smith, when he was only 38 years old, and, probably, the greatest of all long-distance flying pioneers. Fittingly, the 1945 test-flight crew included, as pilot, Wing Cdr. G. H. Purvis, who often flew with Smithy on barnstorming tours, and, as co-pilot, Smithy's nephew, Wing Cdr. John Kingsford Smith, an Australian air ace of World War II.

CANADIAN PILOTS' LICENCES

THE Canadian Civil Aviation Division of the Department of Transport have announced that pilots who have their Service wings may obtain civilian licences without flying tests and with some of the written tests also eliminated.

Proof of Service flying qualifications must be furnished together with a certified copy of the final medical report prior to release from the Service. Three passport-size photographs must accompany the application.

For Limited Commercial Pilots' tickets all flying tests will be waived and the only examinations required will be on Air Regulations, Traffic Rules and Information Circulars.

Application for a Public Transport Pilot's Licence is also admitted without flying tests with the exception of those for instrument flying. The Department of National Defence for Air will, where applicable, give a certificate of competency following a practical test which will be acceptable in lieu of the instrument flying test.

R.C.A.F. pilots are advised to complete arrangements for the above tests before their release from the Service, and pilots intending to apply for Commercial or Transport licences should arrange for a special Air Force medical examination, includnig electro-cardiograph, before being discharged from the Service.

R.N.Z.A.F. RELEASES

NEW ZEALAND'S Minister of Defence, Mr. Jones, said in a recent statement that some 3,000 members of the R.N.Z.A.F. would be returning home in the next few months, and that about 2,000 ground crew personnel would also be released from New Zealand stations. Two flying training stations in the South Island would close, but these changes would not reduce full-scale Air Force operations in the Pacific.

Three N.Z. squadrons will remain with the R.A.F. plus a small number of aircrew with operational experience whom the R.A.F. may still require. Two of the squadrons will undertake garrison duty in Europe for a short period, after which the men will return to the Dominion, and the third squadron—a heavy bomber unit—will join the war against Japan under R.A.F. command.

The great majority of New Zealand airmen will, therefore, be returning home to the islands, leaving about 1,100 serving with the Royal Air Force, which number will be still further reduced when the two squadrons in Europe are released.

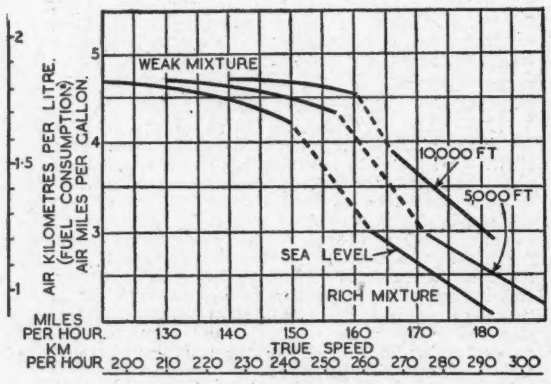
Mr. Jones also stated that personnel with long operational service would be released if they so desired. Those who had little or no operational flying and whose training was suitable would be available for R.N.Z.A.F. service in the Pacific.

Back Into "Civvies"

The Avro Anson Becomes a Useful Feeder-line Aircraft as the Avro Nineteen

DELIVERY is the key word where post-war commercial aircraft are concerned. After hearing so much about the long delays that must inevitably occur before British civil machines can be on the routes, it is good to learn that at least one firm, A. V. Roe & Co., Ltd., has a type ready for delivery *NOW*. True, it is not a wonderful new design combining all the best features of the helicopter and the stratosphere jet-propelled speed-of-sound beater, but it *is* an aircraft which has proved itself for sturdy reliability in all sorts of weather over tens of thousands of flying hours and millions of air miles flown. It is the Avro Nineteen, which is the civil version of the famous Anson.

The conversion is really a re-conversion, or de-conversion if that be the more descriptive term. Perhaps an outline history may serve to refresh memories. Early in 1935 two Avro 652 monoplanes with Siddeley Cheetah V engines were delivered to Imperial Airways. They were christened *Avatar* and *Avalon* respectively, and were intended chiefly for long-distance charter work. In the same year the Air Ministry ordered a general reconnaissance version, the first unit to receive the Anson, as this type was named, being No. 48 squadron. The Avro works series number of the Anson was the 652A. The prototype had two Cheetah Mark VI engines, developing 290 h.p. each at 6,000ft., but when the machine really got into production (the first order was for 174 machines, a very substantial production for those days!) it was fitted with Cheetah IXs, which ran on 87 octane fuel and developed a maximum power of 340 h.p. at 6,800ft. The most notable external change compared with the civil machine was the mounting of a gun turret in the decking aft of the cabin.



This chart of air miles per gallon plotted against cruising speed shows that at 3,000ft. there is little gain in fuel economy by operating below 140 m.p.h. Above 150 m.p.h. the fuel consumption rises rapidly. These cases correspond to 48 per cent. and 53 per cent. of the take-off b.h.p., so that the engines are running with a comfortable margin, thus contributing to low maintenance cost.

War History

Thus at the outbreak of war in 1939 the Anson was available in large numbers for service with Coastal Command, where it did excellent work on convoy duties and coastal reconnaissance. In 1940 the Anson was chosen as the standard twin-engined trainer for the Empire Air Training Scheme. During 1943 there arose a need for a short-range small transport aircraft for the R.A.F., and the Anson fuselage was redesigned to give greater internal capacity than that of the standard trainer. This type was duly produced, and it is from it that the Avro Nineteen has been developed.

Reliability is one of the first characteristics demanded by an operator. The Avro Nineteen has two Cheetah XVs, a type of engine which has an unexcelled record in this direction, and the period between overhauls of which exceeds 1,200 hours. Moreover, compared with the original Cheetah Mark VI, the power available for take-off is 420 h.p. for each engine (at 2,550 r.p.m. and +4 lb./sq. in. boost).

The maximum permissible loaded weight of the Avro Nineteen is 10,400 lb. The disposable load will obviously vary somewhat with the cabin and other equipment. Alternative seating accommodation is available for six, eight or nine passengers. As a typical case we may take the 8-passenger version. The disposable load is 2,671 lb., made up as follows: Crew (2), 340 lb.; passengers (8), 1,360 lb.;

BACK INTO "CIVVIES"

luggage, 200 lb.; fuel (86 gals.), 645 lb.; oil (14 gals.), 126 lb.

At a cruising speed of 155 m.p.h. at 3,000ft. the fuel consumption is 33 gallons per hour (4.7 miles per gallon), giving a still-air range of 356 miles. If only six passengers are carried, more fuel can be taken on board and the range goes up to 610 miles. The take-off run to clear a 50ft. screen is 700 yards, and the landing run over the same obstacle is 570 yards. The direct cost per passenger mile when carrying eight passengers is 1.63d.

Cost Figures

This cost figure has been arrived at by the makers on the following assumptions:—

Annual utilisation of aircraft, 3,000 hours. Annual flying time of crew, 900 hours. Life of airframe, five years. Residual value of airframe at end of five years 25 per cent. Life of engines, 5,000 hours. Residual value of engines at end of five years, nil. Cost of airframe and airscrews, £8,500. Cost of engines, £2,000. Weight of airframe and airscrews, 5,741 lb. Fuel has been taken at 1s. per gallon, and oil at 6 per cent. of fuel. Pilot and co-pilot salaries at £1,900 a year. Airframe maintenance at 25s. per 10,000 lb., and engine maintenance at the same figure per 1,000 cruising b.h.p. Airframe depreciation has been calculated as $\frac{£8,500 \times 0.75}{5 \times 3,000}$ and engine depreciation as $\frac{£2,000}{5,000}$. Insurance has been taken as eight per cent. of 75 per cent. of the first cost, and interest on capital at 3 per cent. of £10,500.

These figures give a direct operating cost of £8.43 per hour at 155 m.p.h., or 13.06 pence per aircraft mile and 1.63d. per passenger-mile when carrying eight passengers. The figures will, of course, vary in different localities, but they serve as a guide to the sort of operating economy that may be expected.

The empty weight of the Avro Nineteen is 7,419 lb. and includes all standard equipment except seats and toilet, since these vary with different loadings. In computing ranges and payloads the following item weights of standard equipment have been used: passenger's seat and belt (each), 12 lb.; toilet, 45.5 lb.; water in toilet tank, 20.0 lb.; Verey pistol and cartridge stowage, 5.5 lb.; fixed fittings for radio installation, 105.0 lb.

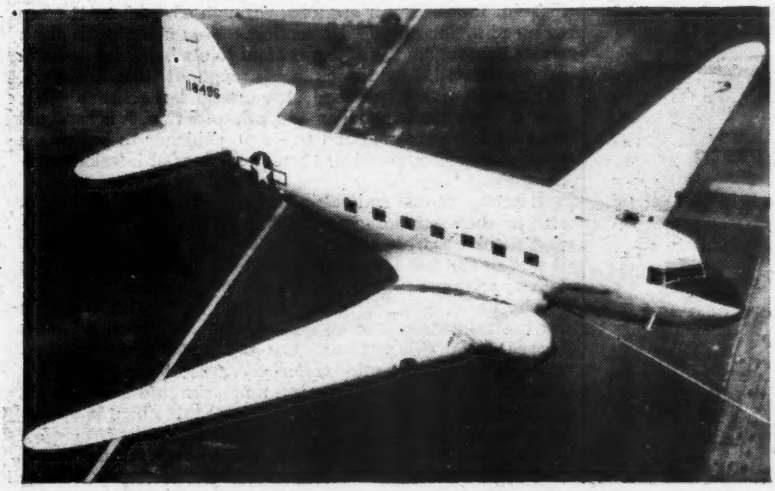
On this basis three typical loading summaries appear as follows:—

No. of Passengers	6	8	9
	lb.	lb.	lb.
Empty weight	7,419	7,419	7,419
Seats and belts	72	96	108
Toilet and water	65.5	—	—
Verey pistol	5.5	5.5	5.5
Tare weight	7,771	7,730	7,568
Crew (2)	340	340	340
Passengers	1,020	1,360	1,530
Baggage	150	200	225
Fuel	990	645	610
Oil	126	126	126
Total loaded weight	10,387	10,401	10,399
Range (miles)	572	356	334

As for passenger accommodation, the comfort of this depends, of course, largely on the number of seats installed. In the six-passenger version, particularly suited for charter work, there is a toilet aft of the cabin and the seats are far enough apart fore and aft to give plenty of leg room. By doing away with the toilet, and crowding the seats together slightly, nine passengers can be carried. This would be suitable for feeder-line routes on which the stages are short, and where, consequently, freedom of movement is less important. In all cases the cabin is soundproofed with damp- and vermin-proof glass silk, and upholstered in fire-resisting fabric. Luggage racks run the length of the cabin on both sides. General illumination is provided by flush-fitting roof lamps, and in addition each passenger has a separate reading lamp. General heating and ventilation is provided by a ducted system, with the temperature under the control of the pilot. In addition, each passenger has a controllable supply of cool air. Any or all of the seats can be quickly removed for the purpose of carrying extra luggage, freight or mails.

GLIDER DAKOTA

WHEN setting about the design of an ideal glider for use with the C-54 Skymaster, the glider branch at Wright Field found that the size and weight coincided with Dakota specifications. They thereupon decided to try an adaptation, and, after removing the engines and airscrews, fitting streamlined caps in their place, and removing all excess weight and unnecessary fittings, a tow attachment point was fitted beneath the centre section, tests were made, and the experimenters found themselves with a highly efficient and virtually ready made glider ready to hand.



According to the experimenters, the tests revealed the machine to be so "clean" that towing was possible at 290 m.p.h. as compared to the normal glider tow maximum of 200 m.p.h. It was also found that it had a payload of over seven (U.S.) tons and a minimum glide declivity of 14 : 1 as compared with the conventional glider's 10 or 12 : 1. In addition, the new version is said to have the remarkably low stalling speed of 35 m.p.h., and, furthermore, to require no ballast for flying at minimum weight conditions. It would appear as though the old Dakota may have been given a new lease of life.

Successful trials were also made using two coupled tug aircraft to give assisted take-off. At height the leading tug cuts loose and the other tug and glider go merrily on.

CAPPED WITH SUCCESS: Powerless yet effective the Glider Dakota can here be seen on the end of its nylon tow rope.

Zeke 32 (Hamp)

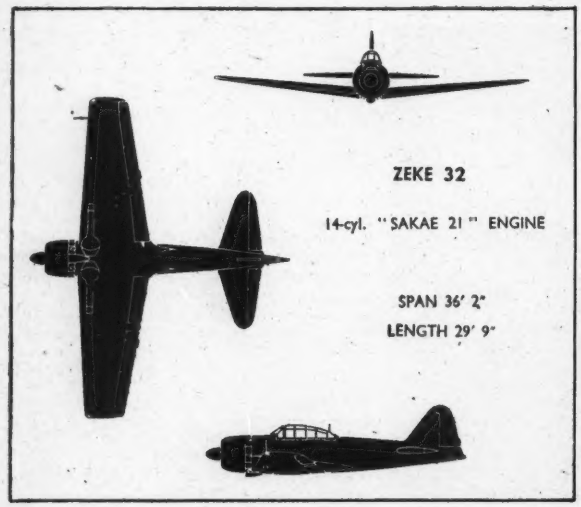
Survey of the Japanese Single-seat Fighter Developed from the Original Zero

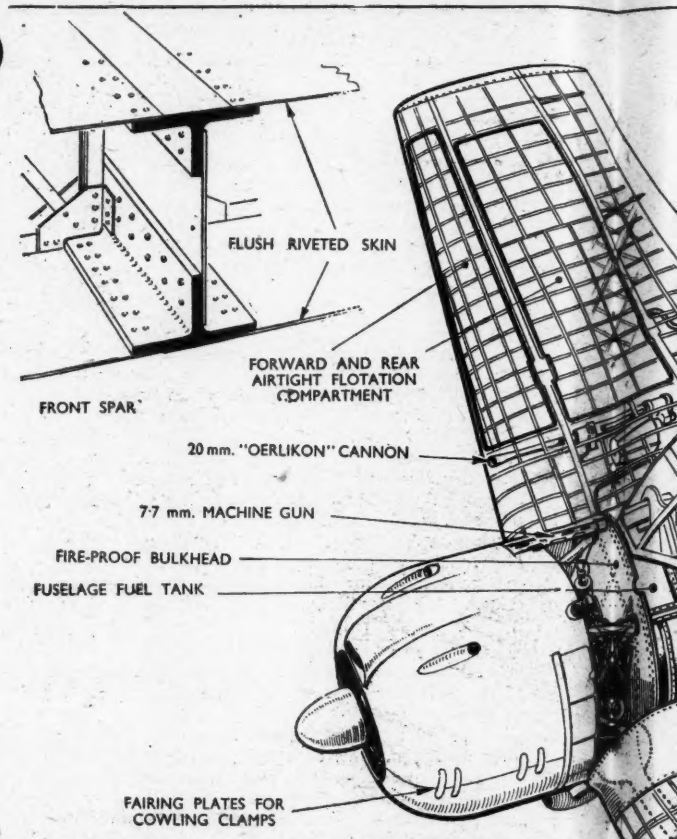
ALTHOUGH the United States authorities have doubtless informed the Air Ministry and M.A.P. of all the knowledge gained from captured Jap aircraft, virtually nothing of a detailed or specific nature regarding Japanese machines has been released on this side of the Atlantic. Not a great deal has appeared on this subject in the various American aviation magazines, but the May issue of *Aviation* included an analysis of the Zeke 32, which source we acknowledge in publishing this article.

In general, design of the Zeke 32 can be said to be orthodox, although there are one or two features of the machine which are unconventional. Those responsible for this aircraft seem to have had as their criterion the achievement of a very low percentage structure weight, and nothing has been spared to keep weight down, neither excessive man-hours to produce complex units, nor increasing maintenance difficulties for ground crews. The most outstanding example of this creed is the complete absence of protective armour plating and the elimination of self-sealing fuel tanks, which results in a machine that is extremely vulnerable despite good manœuvrability at medium speeds. Weight saving as a prime element of design would, when carried to such lengths, appear to indicate that the aircraft is flimsily built; this, however, is not the case as tests made upon it show that in strength it compares favourably with many American machines.

Difference between the Zeke 32 and its predecessor is principally the employment of a Sakae 21 engine (developed from the Sakae 12) and the substitution of fixed squared wings for the original folding, elliptical type. The Sakae 21 is a 14-cylinder, two-row, air-cooled radial unit developing 1,020 b.h.p. at 2,600 r.p.m. at 6,400ft. As installed in this particular aircraft the engine has a down-draught carburettor and a two-speed supercharger, and drives a 10ft. 3in. dia., three-blade airscrew which is very similar indeed to the Hamilton Standard design. A feature of the engine installation is the snug cowling which has an overall diameter of only 45in.; built in upper and lower halves joined by hook-type clamps, it is carried on channel-section rings supported on the front and rear rocker boxes.

Immediately aft of the engine is a thin sheet-steel fire-wall behind which is the fuselage fuel tank. The fuselage itself is built in two parts, a front and rear; the former, which extends to the rear of the cockpit, is a semi-monocoque structure built integrally with the wing, the top surface of which forms the cockpit floor. The rear fuselage is a full monocoque and is butt-bolted to the front section.





A *Flight* copyright drawing by J.P. of the Zeke 32 showing the layout and structure of Japan's best fighter. The simple, almost elementary, construction (with the exception of a few unnecessarily complex units) is probably enforced by reason of the shortage of highly skilled labour in Japan.

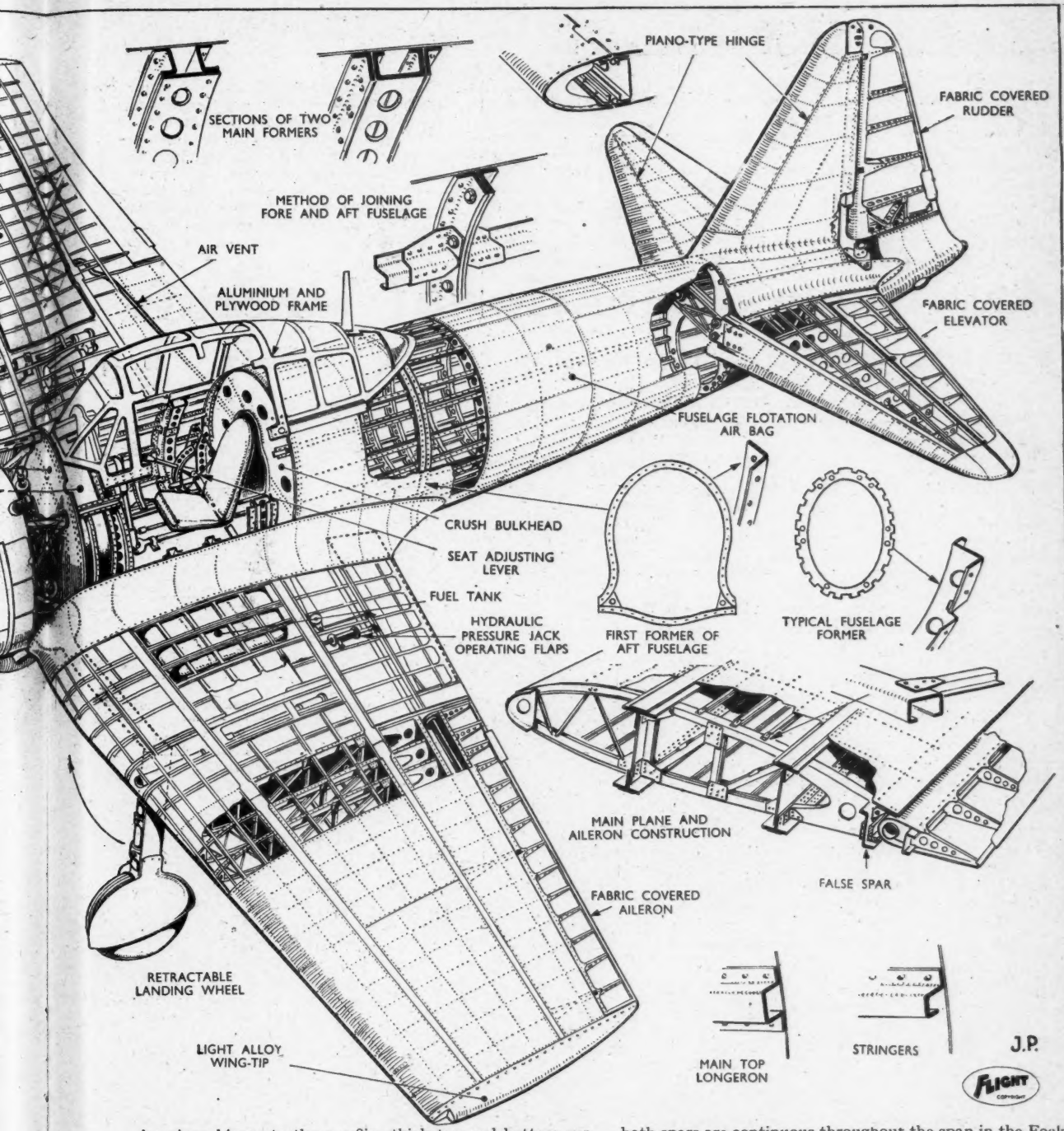
Ultra Light Skin

An unusual structural feature, by normal standards, is the very thin skin plating employed which varies from 0.048in. for the lower sections, through 0.035in. at the top to 0.018in. for all the aft section. This skinning is flush riveted throughout, all longitudinal joints being lapped and others butted. Additionally, throughout this machine, very small rivets are used, few being larger than $\frac{1}{8}$in., whilst some are as small as $\frac{1}{32}$in.; despite this, it is reported that there has been found to be no evidence to indicate a lack of strength, nor have there been signs of inferior workmanship.

Removal of the tail fairing cone exposes the tail wheel and (unconventional) combination hydraulic retracting jack and shock absorber strut. Ease of access to this assembly is one of the few features of the Zeke 32 which would find favour among maintenance personnel.

The fin is built integrally with the rear fuselage except for the 10in. deep leading edge which is attached by piano hinges each side. Construction is otherwise orthodox except that, here again, the side panels of the fin are but 0.016in. thick. The rudder is a fabric-covered unit without trim surfaces other than a small metal tab which is adjustable on the ground.

Tailplane construction is similar to that of the fin in having a detachable leading edge of 0.025in. skin attached



by piano hinges to the 0.018in. thick top and bottom surface plating of the tailplane. Elevators are fabric covered and follow conventional lines in construction; they are the only control surfaces on the aircraft to have controllable trim tabs, these being operated by a vernier drum in the cockpit with cables to gear boxes from which chains give positive drive.

The wing presents various unorthodox features, the chief of which is the joint in the wing spars occurring about halfway along each span. Since no design or production advantages are to be gained, this measure would seem to indicate either a limitation in the availability of extrusion lengths or limitation in milling bed lengths. With the joints, both spars are continuous throughout the span in the Focke Wulf 190 manner, and should either side sustain damage the entire wing together with the integral front fuselage would need to be replaced. The front spar is at 32 per cent. root chord and 27 per cent. tip chord throughout the span, and the rear spar at 65 per cent. root chord and 64 per cent. tip chord. Neither upper nor lower wing surfaces between spars and forward of the front spar are concerned with beam bending.

Surface Finish

Surfaces of the wing, like those of the fuselage, are very smooth. Leading edge skin is 0.028in.; top surface between

ZEKE 32 (Hamp)

spars out to the cannon emplacement is 0.035in.; from here to the wing tip is 0.027in. On the lower surface between spars the thickness is 0.024in. and aft of the rear spar 0.022in. Most of the rivets are 1/8in. but some are half this diameter.

Ailerons are conventional fabric-covered components swung on three self-aligning ball-bearing hinges. On the Zeke 32 they are 11in. shorter than those of the original Zero. Small metal trimming tabs, adjustable only on the ground, are fitted near the inboard end of each aileron. Flaps are of the hydraulically operated all-metal split type, attached to a false spar by piano hinges. Maximum deflection is 60 deg., but tests have shown that 40 deg. gives the best gliding angle.

The aircraft is fitted with flotation gear for over-water operation, and this consists simply of five waterproof canvas bags, two in each wing panel and one in the monocoque after fuselage. Wing bags are sealed and only the fuselage bag is inflatable at will. When faced with ditching, the pilot opens a barrel-valve in a tube leading to the bag and air is rammed through the intake to inflate the bag, the valve being automatically closed when a given inflation pressure is reached. A curious refinement considering the lack of other safety measures on the aircraft.

Japanese Operational Aircraft

Latest Information in Tabular Form : Code Names in Alphabetical Order

INFORMATION on Japanese aircraft is still scanty and not always reliable, but the following data on 40 types now in operational service has been compiled from official sources. Dimensions are to the nearest inch but weights and performance figures are approximate. Blanks in the tabulations indicate that the information is either not available or that it is not sufficiently reliable to warrant inclusion.

Code Name	Type	Makers	Eng no(s)	H P	Dimensions		Weight empty lb.	Top Speed (m.p.h.)	Range (miles)	Climb (ft./m'n.)	Armament	Remarks
					Span ft. in.	Length ft. in.						
Betty II	Medium bomber	Mitsubishi	2 Mitsubishi Kasei 11	1,500 (take-off)	82 0	64 7	15,000	270	3,200	1,200 (sea-level)	Four 7.7 mm. one 20 mm.	Carries crew of 7 to 9.
Betty 22	Medium bomber	Mitsubishi	2 Mitsubishi Kasei 21	1,800 (sea-level)	82 0	65 9	17,000	330	2,800	1,200 (sea-level)	Three 7.7 mm. two 20 mm.	May sometimes carry two torpedoes.
Cherry	Recon.	Mitsubishi	2 Mitsubishi (unknown type)	—	77 0	54 7	—	—	—	—	—	
Dave II	Recon. bomber	Nakajima	1 Nakajima Kotobuki 3	650 (sea-level)	35 8 34 4	28 3	3,800	180	800	900 (sea-level)	Two 7.7 mm.	Single-float biplane.
Dinah 2	Light Rec. bomber	Mitsubishi	2 Mitsubishi Type 1	1,000 (sea-level)	48 3	36 3	8,000	360	1,700	2,700 (sea-level)	One 7.7 mm.	
Emily 22	Flying boat	Kawanishi	4 Mitsubishi Kasei 22	1,400 (take-off)	124 0	92 6	34,000	290	4,000	1,200	Four 12.7 mm. five 20 mm.	Most heavily armoured and armed of all Jap aircraft. Resembles Sunderland.
Frances	Torpedo bomber	Yokosuka	2 Nakajima Homare 11	1,800	65 7	49 2	—	355	—	—	Two 20 mm.	Also night-fighter version with four 20 mm. and one 30 mm.
Frank 1	Fighter	Nakajima	1 Nakajima Ha 45	2,000	37 1	32 4	—	400+	1,700	—	Two 20 mm. two 12.7 mm.	
George II	Fighter	Kawanishi	1 Nakajima Homare 21	2,000	39 4	29 7	—	400+	—	—	Four 20 mm. two 7.7 mm.	Landplane version of Rex.
Glen II	Recon.	Yokosuka	1 T.G.D.A. Model 11	—	36 0	28 0	—	100	—	—	One 7.7 mm.	Carried by submarines and launched at sea.
Grace II	Torpedo bomber	Aichi	1 Nakajima Homare 11	1,100	47 3	37 7	—	350	—	—	Two 20 mm. one 7.7 mm.	Alternative armament of three 7.7 mm. Latest known single-engined torpedo-bomber.
Helen 2	Bomber	Nakajima	2 Nakajima Type 2	1,300	66 7	53 0	—	275	1,400	—	Guns in nose, dorsal and tail	Now being replaced by Peggy.
Irving II	Fighter	Nakajima	2 Nakajima Sakae 21	1,100 (sea-level)	55 9	40 0	10,000	330	1,900	1,700 (sea-level)	Three or four 20 mm.	
Jack II	Fighter	Mitsubishi	1 Mitsubishi Kasei 23	1,875	35 5	31 10	—	400+	1,100	—	Two 20 mm. two 7.7 mm.	A standard Navy fighter.
Jake II	Recon. bomber	Watanabe	2 Mitsubishi Kinsei 43	1,000 (sea-level)	46 9	37 0	5,800	200	1,500	1,300	One 7.7 mm.	Twin float plane.
Jill 12	Torpedo bomber	Nakajima	1 Mitsubishi Kasei 25	1,800	46 6	35 0	—	320	2,000	—	Two or three 7.7 mm.	Replacement for Kate; also used for reconnaissance.
Judy II	Dive-bomber	Yokosuka	1 Aichi Atsuta Model 21	1,160	37 10	33 7	—	325	2,110	—	Two or three 7.7 mm.	With Tony 1 the only Jap. aircraft known to be fitted with Vee-in-line, liquid-cooled engines.
Judy 33	Rec. dive-bomber	Yokosuka	1 Mitsubishi Kinsei 62	1,850	37 10	33 0	—	350	—	—	Two or three 7.7 mm.	Same as Judy II except for radial engine.
Kate 12	Torpedo bomber	Nakajima and Mitsubishi	1 Nakajima Sakae 11	1,000 (sea-level)	51 0	34 6	5,400	220	1,800	1,100 (sea-level)	Three 7.7 mm.	Carries one torpedo or two 500 lb. bombs.
Lily 2	Bomber and dive bomber	Kawasaki	2 Kawasaki Type 2	1,020	57 4	42 1	—	312	—	—	Nose, dorsal and ventral 7.7 mm.	Old type used in Burma and the Marshall Islands.
Liz	Recon. bomber	Nakajima	4 Mitsubishi Kasei 21	1,825	140 0	85 0	—	—	—	—	—	Unsuccessful as heavy bomber, now used as military transport.
Mavis II	Flying-boat	Kawanishi	4 Mitsubishi Kinsei 43, 46	1,000 (take-off)	131 0	82 0	25,000	220	3,900	1,000	Four 7.7 mm. one 20 mm.	Now being replaced by Emily 22.
Myrt II	Recon.	Nakajima	1 Nakajima Homare 21	2,000	41 1	36 6	—	375	—	—	One 7.7 mm.	Fastest Navy reconnaissance type.
Nell 22	Torpedo bomber	Mitsubishi and Nakajima	2 Mitsubishi Kinsei 45	1,000 (take-off)	82 0	54 0	12,500	240	2,220	1,100	Four 7.7 mm. one 20 mm.	
Nick 1	Fighter	Kawasaki (probably)	2 Mitsubishi Type 1	1,100 (sea-level)	50 0	34 0	8,350	350	1,300	2,400	One 7.7 mm. two 12.7 mm. one 37 mm.	
Norm II	Recon.	Kawanishi	1 Mitsubishi Kasei 24	1,800	46 0	37 7	—	319	—	—	One 7.7 mm.	Latest known Navy reconnaissance float-plane.

(Continued on page 149).

JAPANESE OPERATIONAL AIRCRAFT

Code Name	Type	Makers	Engine(s)	H.P.	Dimensions		Weight empty lb.	Top Speed (m.p.h.)	Range (miles)	Climb (ft./min.)	Armament	Remarks
					Span ft. in.	Length ft. in.						
Oscar 1	Fighter	Nakajima	1 Nakajima Type 99	950 (sea-level)	37 8	26 8	3,900	303	1,630	2,930 (sea-level)	One 7.7 mm. one 12.7 mm.	
Oscar 2	Fighter	Nakajima	1 Nakajima Type 2	1,100 (sea-level)	35 7	29 2	4,100	—	—	3,300	Two 7.7 mm.	
Paul II	Recon.	Aichi	1 Mitsubishi Kinsei 54	1,280	42 0	35 7	—	280	—	—	Two 20 mm. two 7.7 mm.	Floatplane; alternative armament is combination of 13 mm. and 7.7 mm. guns.
Peggy 1	Bomber	Mitsubishi	2 Mitsubishi Ha 42	1,850	73 5	63 10	—	—	—	—	One 22 mm. dorsal and other guns.	Also used as torpedo-bomber, and probably for launching Baka bombs.
Pete II	Recon.	Sasabo Nava Arsenal	1 Mitsubishi Kinsei 13	850 (sea-level)	37 0	32 3	4,400	240	650	—	Three 7.7 mm.	A single-float biplane.
Rex II	Fighter	Kawanishi	1 Nakajima Homare 21	2,000	39 4	35 5	—	336	—	—	Two 20 mm. two 7.7 mm.	Single-float type replacing Rufe II. Alternative armament, six 7.7 mm. guns.
Rufe II	Fighter	Mitsubishi or Nakajima	1 Nakajima Sakae 12	900 (take-off)	39 5	29 5	4,000	280	1,200	2,200 (sea-level)	Two 20 mm. two 7.7 mm.	
Sally 2	Bomber	Mitsubishi	1 Mitsubishi Type 1 (?)	1,000	73 9	52 0	10,450	264	1,000	—	Seven 7.7 mm. in nose, dorsal, tail and ventral	Being replaced by improved Sally 3.
Tojo 2	Fighter	Nakajima	1 Nakajima Type 2	1,400 (sea-level)	31 0	29 3	4,300	375	800	3,900 (sea-level)	Two 12.7 mm. two 7.7 mm.	
Tony 1	Fighter	Kawasaki	1 Kawasaki Model 2	1,100 (sea-level)	39 0	30 0	5,000	360	1,900	2,400 (sea-level)	Two 12.7 mm. two 7.7 mm.	Alternative armament of four 12.7 mm. guns
Topsy	Transport	Mitsubishi	2 Mitsubishi Kinsei	850	74 0	52 8	11,900	266	1,867	—	—	Military transport version of an 11-seater airliner.
Val. II	Dive-Bomber	Aichi	1 Mitsubishi Kinsei 44	1,000 (take-off)	47 8	32 11	5,200	240	1,200	1,600	Three 7.7 mm.	
Zeke 32	Fighter	Mitsubishi and Nakajima	1 Nakajima Sakae 21	1,100 (sea-level)	36 5	29 9	3,900	350	1,500	3,500 (sea-level)	Two 20 mm. two 7.7 mm.	Old code name, Hamp.
Zeke 52	Fighter	Mitsubishi and Nakajima	1 Nakajima Sakae 21	1,100 (sea-level)	36 3	29 9	4,100	350	1,500	2,800 (sea-level)	Two 20 mm. two 7.7 mm.	

INDIAN FLYING-BOAT BASE

One of the largest flying boat bases in India is at Korangi Creek, Karachi. This base does most of the maintenance work on R.A.F. Catalinas and Sunderlands and it is here that Catalinas and Sunderlands arriving from the U.K. are "routed" to their forward bases. R.A.F. flying boats have played many roles during the war in S.E. Asia. In addition to anti-submarine and shipping patrols, shadowing of Jap naval task forces, bombing vital targets, and ferrying sick and wounded, R.A.F. Catalinas take part in anti-locust patrols, making daily sorties over the mountains and deserts of Baluchistan and across the Persian border with the object of checking and wiping out the breeding places of the locust pests which constitute a great menace to the agriculturalists in North West India.

Portrait Gallery . . . . .

(Left) Group Capt. A. F. Avant, D.S.O., D.F.C., R.C.A.F.

Wing Cdr. B. Jarkowski, D.F.C., Polish Air Force.

Air Commodore H. W. Satterley, C.B.E., D.F.C.

Sqn. Ldr. W. F. Caldow, A.F.C., D.F.M.

Sqn. Ldr. E. R. Lacey, D.S.O.

Air Commodore D. L. Thomson, D.S.O., D.F.C.

The late Wing Cdr. Hubert Law Wright, D.S.O., D.F.C.

Wing Cdr. G. G. Petty, D.S.O., D.F.C.

(Left) Sqn. Ldr. S. Slater, D.S.O., D.F.C. and Bar.

Wing Cdr. T. Pozyczka, D.S.O., D.F.C., Polish Air Force.

(Right) Wing Cdr. L. L. Mackinnon, D.S.O., D.F.C. R.C.A.F.

Capt. W. C. Sheen, D.S.O.

Sqn. Ldr. J. L. Munro, D.S.O., D.F.C., R.N.Z.A.F.

Flt. Lt. W. McIntosh, D.F.C. and Bar, D.F.M.

Flt. Lt. H. J. West, D.S.O.

Wing Cdr. J. Woodroffe, D.S.O., D.F.C. and Bar.

Air Vice-Marshal C. R. Slemon, C.B.E., R.C.A.F.

F/O. J. Castagnola, D.F.C. and Bar.

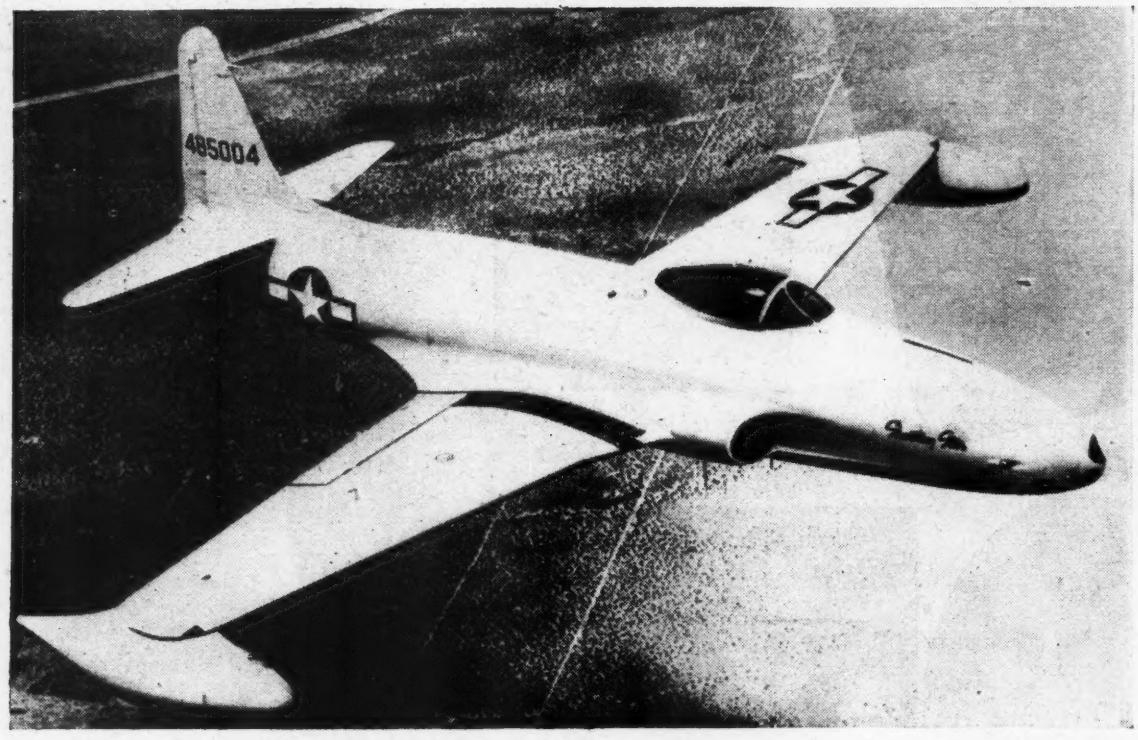
Group Capt. J. E. E. Pelly-Fry, D.S.O.

Group Capt. R. Beill, D.F.C., Polish Air Force.

(Left) Wing Cdr. R. McFarlane, D.S.O., D.F.C. and Bar.

(Right) Sqn. Ldr. R. B. Osborn, D.S.O., D.F.C.

Lockheed Shooting Star



An air-to-air shot of the new Lockheed P 80. It is to be deplored that officialdom does not allow us to publish companion photographs of British jet aircraft such as the de H. Vampire, to show the world we are not lagging behind.

America's Latest Jet-propelled Plane

LOCKHEED'S P 80 turbine jet-propelled fighter, the Shooting Star, was briefly described in *Flight* of April 12th, and we are now able to illustrate the design. Claimed to have a speed of over 550 m.p.h. and a service ceiling of over 40,000ft., it has lately been fitted with auxiliary fuel tanks at the wing tips for longer ranges. This new fighter is notable for its highly developed laminar flow wing section based upon an N.A.C.A. equation. The leading edge is almost "knife-edged." A modern type of bubble canopy is adopted.

Total weight is exceptionally low, and wing loading is said to be below that of any first-line fighter. G.E.C. manufactured the turbine compressor unit, which is started by a small electric motor. A feature is that the power unit may be dismounted in fifteen minutes. In the Shooting Star air enters the compressor via an intake on each side of the cockpit immediately ahead of the wing roots. The efflux emerges from the extreme tail.

The cabin is pressurised for high altitude work, and the standard cockpit equipment includes attachment for gravity suits to lessen discomfort and danger of black-out in sharp turns and pull-outs. Rapid manœuvrability is possible by the use of hydraulic aileron boosters and electrically operated flaps. G. S.

R.C.A.F. RESEARCH AND DEVELOPMENT

THE creation of a new branch in the R.C.A.F., to be known as the research and development division, and the appointment of Air Vice-Marshal E W. Stedman to the Air Council as head of the new division, has been announced by R.C.A.F. headquarters.

Need for the new division, the announcement says, became increasingly evident throughout the European war with the introduction of new and ingenious devices and weapons. Flying bombs and long-range rocket opened up entirely new fields, all of which must be exploited. The advances made in aircraft power plants, and particularly the gas turbine, geared to drive an airscrew or used as a jet, have revolutionised military aircraft.

The new division's duties will include the initiation and co-ordination of all research development and experimental work for the R.C.A.F.; technical supervision of all research and development establishments; promulgation of scientific information to personnel of the service; co-operation with the aircraft industry in the development of aircraft suitable for R.C.A.F. purposes; acting as a liaison on research and development subjects between the R.C.A.F., the other services and all outside bodies.

That R.C.A.F. squadrons will eventually be equipped with jet-propelled aircraft was also indicated in an Air Force headquarters release, which disclosed that a jet-propulsion unit suitable for use by the R.C.A.F. is being designed.

The announcement, which outlined Canada's part in the development of jet-propelled aircraft during the war, said the unit is being designed by the Government-owned Turbo Research, Limited, and added:

"This is a most opportune time to begin the development of jet-propelled aircraft in Canada, first, because of the need of the R.C.A.F. to be provided with an up-to-date prototype, and, secondly, it is to be observed that civil developments have always followed military developments and, therefore, civil aviation should ultimately benefit as well."

Is the Bomber Obsolescent ?

Bomb and Rocket Rivalry : Threat to an Island Kingdom : Supreme Need for Air Defence

By MAJOR F. A. de V. ROBERTSON, V.D.

IN the issue of *Flight* of July 19th last Mr. A. V. Cleaver discussed comparatively the future of the rocket and the bomb. The accuracy of the former will, he believes, be improved, though only to the extent of making certain of hitting a big city. To hit a relatively small factory will, he thinks, remain the prerogative of the precision bomber.

It is hard to prophesy what science will or will not be able to achieve in the future. Mr. Cleaver's conclusions appear incontrovertible at the moment; but who can assert with certainty that science will not some day be able to direct the rocket on to a particular factory? If that can be done, it would appear that the day of the piloted bomber will then be over. On the other hand, one cannot say for certain that science will not discover some means of defeating the rocket. In neither attack nor defence have we yet reached the limits of what wireless and radar can achieve. Mr. Cleaver says truly that we cannot stop artillery shells in the air, and he might have added that we cannot affect the fall of a bomb once it has left the aircraft. Neither of these missiles has anything to do with wireless or radar, and it may be presumed that if rockets of the V.2 class are ever to become meticulously accurate, both wireless and radar will enter into the question. They may also (who knows?) play their part in defeating the rocket.

If the future of the rocket is to be merely indiscriminate destruction in big cities, while the elimination of particular factories remains the role of the bomber, the belligerent of the future will have to choose which weapon will help best to achieve his purpose—or he may decide that the two should be used in combination. If that belligerent is of the same temper as Hitlerite Germany, he will probably use both. The Germans in the second world war clung to the use of indiscriminate destruction in the cities of their opponents. So far as a Briton can fathom the workings of the German mind, their idea seems to have been the desirability of punishing their enemies and making them suffer.

Military Cruelty

In this they differed from the mediæval commanders, who used periodically to give a captured city over to pillage and rapine at the hands of their soldiery. Such men as the Black Prince (generally hailed in his day as the Flower of Chivalry) usually permitted such horrors with the definite military object of terrifying other towns into submission. This does not excuse them; but it clears their reputations from the charge of utterly senseless cruelty. It is less reprehensible to be cruel with a military object than to be cruel from a mere sadistic impulse. Moreover, sadism in war is foolish. It does nothing towards winning the war and it renders those guilty of it liable to punishment as war criminals. Victors will not always be so slack in taking vengeance as they were in 1918. Mr. Cleaver suggests that German methods of hitting at cities as apart from military targets might in the future have more effect than they had in the war just concluded. It may be so, but we have no evidence on which to form conclusions. German cities suffered far more from bombing than any British cities did; but it was not the collapse of civilian German *moral* which caused the surrender of the armed forces. We have yet to see if the fate of Japan will afford any evidence.

Because the Germans fought in many ways with stupidity it is not to be concluded that belligerents in a future war will do the same. If the rocket remains inaccurate, and therefore a mere weapon of terrorism, it is fair to assume that in the future an intellectual Power will not use it—even though it be cheaper in man-hours than the conventional bomb. The clever fighter concentrates on winning, and not until he is sure of winning does he turn his mind towards the punishment of his enemy. It was on that principle that the British bomber offensive against Germany was undertaken, and the Americans have shown a similar spirit in telling the Japanese which cities were next on the bombing roster and warning the inhabitants to evacuate them in good time.

If we may then suppose that future air operations are to be conducted as part of our effort towards national victory, it becomes pertinent to examine what are the future prospects of the bomber, and in particular what are the prospects of Britain in a future war.

Sea Frontiers

The outstanding fact to recognise is that air attack is the greatest enemy of an island power. It is not correct to say that the seas round an island cease to have military importance because aircraft can fly over them. The Channel and North Sea prevented the German armies from marching into Great Britain in 1940 as they had marched into Poland, France, Denmark, Holland and Belgium. Norway was so weak on the sea and in the air that her conquest provides no useful lesson. Britain had no Army after Dunkerque, but she was strong at sea and in the air. The existence of the Channel forced Germany into attempting to gain mastery of the air. Her Air Force was not trained to work without the help of the Army, and it failed miserably to achieve its purpose. Does it follow from that failure that air defence is always capable of mastering air attack? Göring boastfully proclaimed that the case of Crete proved the opposite; but at Crete there was no air defence of any consequence.

What lessons can be drawn from the Anglo-American bombing offensive against Germany? There it seems that air attack had much the best of it. But still we must ask if that air campaign established the principle that air attack is of its essence superior to air defence. If so, though the bomber offensive played a great part in beating Germany to her knees, the prospects for Britain in a future war look far from rosy.

It may be true enough to say that attack is the best form of defence; but it is always necessary to defend one's base successfully. American spokesmen, and others too, have frequently proclaimed that had Fighter Command lost the Battle of Britain the base for all further operations against Germany would have been lost. In fact, the defence of one's base is the first necessity in war. It would indeed be an irony of history if the success of the British bomber offensive were to prove that in another war Britain could not be kept safe.

The Channel, we have shown, is not unimportant when the question of an invasion of Britain is considered. Hostile armies cannot enter the island until control of the sea has been gained; control of the sea cannot be gained until the British Navy has been worsted; neither of these steps is possible until very complete air superiority has been achieved. The air struggle is the preliminary to the other two conquests. But aircraft have certainly lessened the value of the sea barrier.

Before aircraft began to play a part in war, the defence of Britain was purely a naval matter. The English realised that at a very early stage in their history, and throughout the ages have usually contrived to be supreme at sea. Had

IS THE BOMBER OBSOLESCENT?

Alfred's fleet not driven off Rollo the Norseman, Normandy might have been founded in England instead of in France. About a century and a half later the Normans slipped across the Channel unopposed. It was after the defeat of the Armada in 1588 that Shakespeare wrote the famous lines:—

"This precious stone set in the silver sea
"Which serves it in the office of a wall,
"Or as a moat defensive to a house,
"Against the envy of less happier lands."

William of Orange brought Dutch troops into England in 1688, but he came at the invitation of Englishmen, and the majority of them welcomed him. Napoleon's attempt to invade was baulked by British sea power, and in the war of 1914-18 the Royal Navy always ruled the surface of the seas. On the other hand English or British armies have landed on the Continent on innumerable occasions. So long as English or British battleships controlled the seas, England was safe at home and could attack continental enemies.

Now sea power by itself is not enough. Britain must rule the air before sea power can become effective. On the water as well as on land the dictum of Field Marshal Montgomery holds good: "First we must win the air battle, and then we win the land (or sea) battle." So it all boils down to the question of whether air attack or air defence is to be the master in the future.

We have suggested above that the Battle of Britain provides no conclusive answer to the query, because the Germans mismanaged their attack. It may also be held that the bomber offensive against Germany fails to solve the problem. Though anti-aircraft guns are a valuable part of the defence, the only real counter-weapon to the bomber is the fighter aircraft. Germany failed to stop the Allied bombers from achieving their object; but it may be held that that was due to another German mistake. At one point they slowed down the production of bombers in order to concentrate on fighters. It has been suggested by some students that if the Germans had taken that step earlier they might have mastered the attack of the Allies.

It is not much use arguing about "ifs" which did not happen. For the moment we are glad enough to have beaten Germany, even though our success was largely due to German mistakes. Against some more clever enemy in the future (the very distant future, we all hope) our survival may well depend on air defence proving stronger than even well-planned air attack. If the rocket is developed into a weapon of accuracy and no antidote to it is discovered, then no sort of defence may avail us. But if air attack is to remain a matter of piloted bombers, then we must concentrate every nerve and brain and sinew on seeing that our defence is able again to beat off air attack.

Target Analysis

Tonnage of Bombs Dropped and Number of Sea Mines Laid by R.A.F. Bomber Command Monthly from September, 1939, to May, 1945

IN the following analysis the employment of every single bomb dropped by Bomber Command in the 1939-45 war in Europe is shown. Students of military strategy and historians will find endless interest in these figures. The continual fluctuation and change in the fortunes of war can be traced, as can also the ever-growing strength of Britain's bomber effort. Industrial towns, which received no attention until after the *Luftwaffe* started indiscriminate attacks on Britain in 1940, received by far the heaviest punishing. Naval targets had pride of place in 1940, but by 1945 they were fifth in the order of bomb tonnage.

ON THE CITIES

Target.	Tons.
Berlin	45,517
Essen	36,420
Cologne	34,711
Duisburg	30,025
Hamburg	22,580
Dortmund	22,242
Stuttgart	21,016
Gelsenkirchen	19,606
Mannheim Ludwigshaven	18,114
Dusseldorf	17,760
Kiel	16,712
Frankfurt	15,696
Hanover	14,776
Le Havre	13,449
Nuremberg	13,021
Bremen	12,831
Bochum	10,784
Calais	9,736
Brest	8,428
Boulogne	7,827

	Industrial Towns	Troops and Defences	Transportation	Naval Targets	Oil Targets	A/Fs. & A/C. Factories	Specific Industries	Military Installations	Miscellaneous	Total Tons	No. of Mines Laid
1939											
September	—	—	—	6	—	—	—	—	—	6	—
October	—	—	—	—	—	—	—	—	—	—	—
November	—	—	—	—	—	—	—	—	—	—	—
December	—	—	—	25	—	—	—	—	—	25	—
Total 1939	—	—	—	31	—	—	—	—	—	31	—
1940											
January	—	—	—	—	—	1	—	—	—	1	—
February	—	—	—	1	—	—	—	—	—	1	—
March	—	—	—	11	—	20	—	—	—	31	—
April	—	—	—	18	—	76	—	—	18	112	118
May	—	1,245	249	—	117	50	7	—	—	1,668	70
June	—	621	616	22	375	274	192	—	200	2,300	97
July	—	—	225	176	219	488	39	—	110	1,257	156
August	—	—	147	97	297	445	201	—	178	1,365	138
September	—	—	241	1,399	120	184	172	—	223	2,339	49
October	—	—	167	623	299	275	187	—	100	1,651	56
November	—	—	338	264	204	231	183	—	96	1,316	31
December	137	—	165	281	88	105	104	—	112	992	47
Total 1940	137	1,866	2,148	2,892	1,719	2,149	1,085	—	1,037	13,033	762= 510 tons
1941											
January	97	—	107	372	112	25	45	—	19	777	45
February	513	—	80	491	140	96	45	—	66	1,431	66
March	716	—	18	687	153	101	3	—	66	1,744	70
April	972	—	21	1,035	79	108	32	—	149	2,396	129
May	1,513	—	32	941	34	59	152	—	115	2,846	121
June	2,138	—	768	865	4	103	115	—	317	4,310	76
July	1,348	—	1,532	901	48	122	424	—	9	4,384	133
August	1,411	—	1,874	546	6	144	103	—	158	4,242	81
September	962	—	708	901	—	80	204	—	34	2,889	101
October	910	—	1,029	686	—	164	144	—	51	2,984	75
November	1,002	—	—	482	—	38	8	—	317	1,907	111
December	697	—	—	940	—	8	58	—	91	1,794	47
Total 1941	12,339	—	6,169	8,847	576	1,048	1,333	—	1,392	31,704	1,055= 707 tons

TARGET ANALYSIS

	Industrial Towns	Troops and Defences	Transportation	Naval Targets	Oil Targets	A/Fs. & A/C. Factories	Specific Industries	Military Installations	Miscellaneous	Total Tons	No. of Mines Laid
1942											
January ...	853	—	—	1,219	—	32	—	—	138	2,292	62
February ...	285	—	—	376	—	36	—	—	314	1,011	306
March ...	1,711	—	—	298	—	32	510	—	124	2,675	356
April ...	2,667	—	70	847	—	243	397	—	209	4,483	509
May ...	2,383	—	11	231	—	304	211	—	94	3,234	1,023
June ...	6,087	—	—	223	11	390	36	—	98	6,845	1,107
July ...	5,246	—	11	896	—	99	22	—	94	6,368	897
August ...	3,828	61	—	110	—	34	15	—	114	4,162	968
September ...	5,256	—	—	103	—	125	16	—	95	5,595	1,101
October ...	3,124	—	—	394	1	183	37	—	70	3,809	982
November ...	1,700	—	9	662	—	8	9	—	35	2,423	1,156
December ...	2,497	—	34	24	—	7	88	—	64	2,714	987
Total 1942 ...	35,637	61	135	5,383	12	1,543	1,341	—	1,449	45,561	9,574= 6,367 tons
1943											
January ...	2,925	—	30	1,212	—	66	49	—	63	4,345	1,285
February ...	6,339	—	6	4,403	—	16	127	—	78	10,959	1,129
March ...	6,606	—	73	1,668	24	15	2,072	—	133	10,591	1,159
April ...	9,097	—	108	1,335	—	750	41	—	136	11,467	1,869
May ...	11,904	—	113	32	21	600	79	—	171	12,920	1,148
June ...	13,948	—	106	124	—	189	751	—	153	15,271	1,174
July ...	16,090	—	206	6	3	4	391	—	121	16,830	927
August ...	15,674	—	5	—	—	2	1,830	2,072	566	20,149	1,103
September ...	12,066	670	775	—	—	18	1,026	153	147	14,855	1,188
October ...	13,101	—	—	5	6	17	337	—	307	13,773	1,076
November ...	12,537	—	1,456	2	—	7	219	—	274	14,495	976
December ...	11,178	—	—	—	—	7	97	346	174	11,802	800
Total 1943 ...	131,464	670	2,878	8,787	54	1,691	7,019	2,571	2,323	157,457	13,834= 9,136 tons
1944											
January ...	16,566	—	7	78	—	20	63	1,482	212	18,428	1,101
February ...	11,592	—	145	12	—	139	46	9	111	12,054	1,661
March ...	19,456	—	6,243	—	—	1,380	339	14	266	27,698	1,472
April ...	11,997	633	19,230	6	—	1,175	380	7	68	33,496	2,643
May ...	5,396	12,634	15,013	15	—	2,648	1,488	5	53	37,252	2,760
June ...	710	13,729	17,433	3,133	4,496	1,346	50	15,907	463	57,267	1,778
July ...	9,594	8,847	9,475	298	4,407	514	10	24,292	169	57,615	708
August ...	10,181	9,915	4,300	2,988	11,129	5,316	2,543	19,376	107	65,855	1,586
September ...	12,527	26,364	2,633	458	4,835	4,447	3	859	461	52,587	748
October ...	42,246	12,366	536	972	3,682	47	1,082	—	273	61,204	1,133
November ...	27,696	5,689	4,892	159	14,385	19	63	—	119	53,022	750
December ...	16,727	3,677	18,454	1,529	5,109	1,858	1,604	—	82	49,040	1,160
Total 1944 ...	184,688	93,854	98,361	9,648	48,043	18,909	7,680	61,951	2,384	525,518	17,500= 13,170 tons
1945											
January ...	11,931	2,072	8,459	129	9,028	—	1,221	—	83	32,923	668
February ...	21,888	3,756	5,505	561	14,109	—	—	—	70	45,889	1,354
March ...	30,278	8,042	6,229	3,924	18,936	5	11	—	212	67,637	1,198
April ...	2,322	12,056	7,909	6,526	5,437	596	4	—	104	34,954	1,362
May ...	63	155	—	—	—	36	—	—	83	337	—
Total 1945 ...	66,482	26,081	28,102	11,140	47,510	637	1,236	—	552	181,740	4,582= 3,373 tons
Grand Total	430,747	122,532	137,793	46,728	97,914	25,977	19,694	64,522	9,137	955,044	47,307= 33,263 tons

MEDITERRANEAN THEATRE OF OPERATIONS
TONNAGE DISTRIBUTION BY TYPE OF TARGET—HEAVY BOMBERS AND WELLINGTONS ONLY

	Oil Plants, Storage, etc.	Aircraft Factories	Other Industry	Airfields	Communications	Harbours	Military Targets—Army Support	Targets at Sea	Miscellaneous	Total Tons	Tonnage of Mines Laid
1940... ...	14.3	—	1.2	193.0	20.4	146.6	53.6	—	26.3	455.4	—
1941... ...	36.3	41.1	37.3	3,368.3	205.0	3,352.2	852.0	54.2	51.9	7,998.3	43.5
1942... ...	—	—	—	2,601.0	14.5	8,524.4	4,068.7	204.0	9.5	16,337.1	383.0
1943... ...	40.3	123.5	65.0	5,332.0	6,780.7	4,440.3	3,943.5	34.4	82.2	21,301.9	160.7
1944... ...	2,496.1	287.7	419.3	1,449.8	10,564.7	2,280.1	3,311.7	49.0	476.8	21,335.2	1,147.1
1945... ...	244.2	—	—	—	6,643.4	1,232.2	938.1	—	—	9,057.9	—
Totals ..	2,831.2	452.3	522.8	13,444.1	24,223.7	19,935.8	14,082.6	341.6	646.7	76,485.8	1,734.3

CIVIL STIRLING

SHORT BROS., makers of the Sunderland, Shetland and the Stirling, have just announced that the latter machine can be made available as an 18-passenger, mail and freight aircraft. The conversion is in no way complex, and it would appear from a preliminary examination of the particulars that the new version could well fulfil an important part in the obtaining and necessarily restricted air scheme.

It is not suggested that the civil Stirling should be arrogated to a comparable level with the new types at present on the production lines; but, as a stop gap or interim measure, there is much useful work that the aircraft could do at the present time.

That part of the fuselage devoted to the passengers is roomy, with a single row of very comfortable chairs on each side of a generous aisle. Each chair is adjustable and has a table, whilst circular window ports are pitched one for each seat. Cloakroom and toilet accommodation, together with a steward's galley, is arranged at the after end of the passenger cabin.

In addition to the overhead racks for personal effects which are fitted above the seats, passengers' baggage is stowed in a 144 cu. ft. compartment between the wing spars in the centre section.

Freight up to a weight of 1,300 lb. can be stowed in the 124 cu. ft. of nose space, and to round off the picture, the Stirling's very capacious bomb bay is employed to accommodate containers in which 3,600 lb. of mail can be carried. These quantities of mail and freight, together with the passenger and baggage weight total up to 8,500 lb. of payload, i.e., 13.38 per cent. of the all-up weight which, for a job of this nature, is very fair.

An analysis of the operating costs together with illustrations and performance curves for the aircraft will be included in next week's issue.

CIVIL AVIATION

Canada's International Programme

Good Neighbour Policy : Overseas Services

A REVIEW of Canada's programme for international air transport, of progress made and of plans for the future, shows a well-defined pattern being developed as rapidly as conditions permit. As already reported, a new agreement with the United States for air line routes across the border came into effect recently. Trans-Canada Air Lines reports intensive planning for the time when, as sole Canadian agency designated by the Government to operate international air services, it will extend its operations beyond the nation's frontiers. Preparations are being made to set up the Interim International Civil Aviation Organisation agreed on at the Chicago conference last year and which will be located in Montreal.

The international air routes in which Canada is interested fall into two distinct groups. First, there is the group of routes making up the network of air line communications with the United States. Secondly, there are the external routes. In the organisation of world aviation Canada is a strong supporter of the principle of international collaboration and regulation. Each of these three parts of the international programme is receiving attention.

The Border Air Routes

The agreement with the United States, like the earlier agreements, is based on a principle that is long established in Canada-U.S. air route arrangements. It is a principle which, in the Canadian view, might well form a model for any two nations requiring to establish a system of air routes across a common boundary. There is no direct competition between Canadian and United States carriers on international services between the two countries, no duplication of air transport facilities. Instead, Canada and the United States make a division of the routes between them, based on a fair division of the traffic.

Under the new agreement eight Canadian routes operate into the United States; fifteen U.S. lines extend into Canada. Together these twenty-three international air connections will provide direct air line communication with U.S. communities for practically every large centre of population in Canada. Undoubtedly the principle of dividing the routes and the traffic, with a fair share to each country, has made it possible to bring international air line connections into areas which would not have been served had operations been concentrated competitively on the more lucrative routes. Of the two areas of greatest traffic density, one is served by U.S. carriers (the area Ottawa-Montreal-New York-Washington) and one by Canadian carriers (Toronto to New York and Chicago). The other routes are about equally divided. Most of the U.S. routes are already in operation. On most of the Canadian routes the starting of operations depends on additional equipment becoming available. Through connections for overseas services were not discussed under this agreement.

This agreement appears to set the pattern of Canada-U.S. air line arrangements for some time to come. Both countries seem to be satisfied that the division of routes between them is fair and equitable under present circumstances. When Canada is in a position to operate all of the routes assigned to her under the new agreement, and when two new internal routings have been established (Winnipeg-Edmonton direct, and Toronto-Winnipeg via the Lakehead), a comprehensive system of trans-continental air communications with well-planned U.S. connections will have been achieved. It would appear to be adequate for all traffic demands which are likely to be made upon it for some time to come.

External Routes

Three international and overseas services are of interest to Canada and comprise the present programme for external operations: (1) A route across the North Atlantic. (2) A route serving the West Indies and Latin America. (3) Canadian participation in a Pacific route.

Canada attaches considerable importance to a direct Canadian operation across the North Atlantic to the United Kingdom. Two wartime Canadian services are already in operation over this route. A civil Government air service for mail, freight and official passengers flies to the United Kingdom and returns, three times weekly, with Trans-Canada Air Lines as operators of the service on behalf of the Government. The R.C.A.F. operates another mail and passenger service to the United Kingdom.

Trans-Canada Air Lines will start a fare-paying trans-atlantic service on September 1st with modified war priorities enabling some business men to fly to Europe. Fares have not yet been set, but they would not exceed those charged by Pan-American Airways—$525 plus tax for a one-way trans-atlantic trip.

T.C.A. at present has four converted Lancasters on the trans-atlantic run, but they are used entirely for official business. Four more are being added immediately, and it is expected by autumn there will be one flight a day. The flights will be made from Dorval, Quebec, to Prestwick, Scotland.

Dorval airport will be completely a civil aviation airport in less than two years and possibly within one year. At present a large proportion of the facilities of this huge Montreal airport are given over to the Royal Air Force for transport, but gradually the airport is being turned back to Canadian authorities.

On routes across Canada four-engined aircraft are to replace the twin-engined machines used at present and are to be put into service by the T.C.A. next summer. In the meantime work will be started extending runways at terminals. With these aircraft fewer stops will be necessary, and consequently the time required to fly across Canada will be considerably reduced.

In addition to these trunk services two services across Canada with smaller aircraft will be operated, making shorter hops and bringing passengers to concentration points to be transferred to the bigger machines much as local trains feed fast trains.

Outlining these plans, the Hon. C. D. Howe, Minister of Reconstruction, stated that the provision of the Civil Aviation Act to separate the Canadian Pacific Railway Company from its air operations has not been implemented, as it comes into effect only a year after the end of the war in Europe.

Plans for services to the West Indies-Latin America area, and on the Pacific route, are still tentative, but are the subject of intensive study. The West Indies-Latin America service holds particular interest for Canadians because of extensive and old-established trading connections in that area, in which Canadian merchant shipping has long been active. The Pacific route—or that segment of it adjacent to Canada—will be an important link in the system of Commonwealth air communications.

Canada is in agreement with other Commonwealth countries on the basic pattern to be followed for establishment of Empire air services. The routes operated by Canada will form a part of that basic pattern. In the Canadian view each Commonwealth member Government should operate the services, or sections of services, adjacent to its own territory. Out of these co-operative efforts a broad pattern of connecting links, joining the areas of the Commonwealth, would emerge.

As is now well known, Canada plans to operate her external air services on an entirely Canadian basis. That is to say, Canadian identity will not be merged in joint operating companies.

International Organisation

International agreement on the regulation of air traffic is an important part of the Canadian programme. Efforts by Canada's representatives at the Chicago conference to obtain such an agreement were very nearly successful. By the time the conference concluded the area of difference, though decisive, was quite small. It was the general view that agreement in the future was a definite possibility, and the problem was referred for further study to the Interim International Civil Aviation Organisation to be established in Montreal.

In the Canadian view the International Organisation and the international convention on civil aviation on which it is based must possess the authority to regulate and control international air traffic if the organisation is to be fully effective. Canada has emphasised continuously the importance of agreement on these matters to the future peace and security of the world.

Therefore Canada does not accept the present situation as either permanent or final, and is continuing to pursue her efforts to obtain agreement. This remains a prime objective of Canadian policy.

CIVIL AVIATION NEWS

NORWAY'S AIRLINES

NORWAY now has eight air lines in operation including one to London and one to Edinburgh.

They are at present controlled by the Norwegian Air Ministry and served by military aircraft, with military personnel.

FOR DENMARK

AIR services between Danish provinces are to be operated by a new Danish air taxi company. As no pilots have been trained in Denmark during the occupation the company hopes to employ ex-R.A.F. pilots.

SWEDISH EXPERIMENT

ONE of the first Swedish experimental transatlantic flights used Minagan, Quebec, about 100 miles south of Goose Bay, Labrador, as an interim halt and then continued to New York.

Although Sweden was not a signatory to the Chicago interim air agreement, courtesy rights for the flight were granted by the Dominion Government.

FROM CEYLON

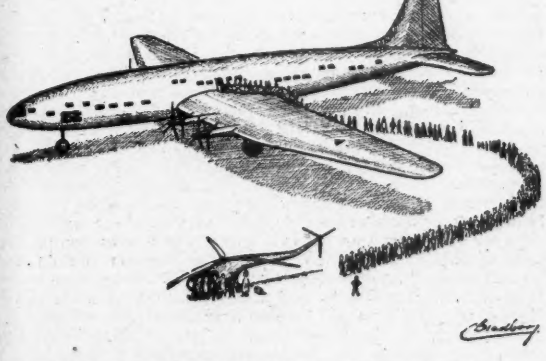
COLOMBO has become one of the chief airports on one of the fast air mail routes between Australia and England. A survey made by the Director of Civil Aviation in Ceylon which notes this as one of the important changes affecting civil aviation in Ceylon, records also as an important factor the acceleration of the Tata air mail service between Ceylon and India. The journey between Colombo and Karachi is now completed the same day.

A sum of Rs.30,000 for providing a part of the equipment for the Colombo airport necessary to meet immediate demands is included in the 1945-46 estimates under civil aviation.

Ceylon has now one of the largest airfields in the world. Hacked out of the dense jungle it is part of the island's share in the development of aviation stimulated by war conditions. From Ceylon aircraft fly to Australia and New Zealand along the longest air route in the world, reaching Sydney in under 55 hours.

AUSTRALIAN PLANS

THE battle around the nationalisation of Australian air lines is still raging, with both sides not sparing each other. Air line operators have published a legal opinion stating that the Constitution does not grant the Commonwealth any explicit power to monopolise any form of trade or transport. Following Mr. Menzies' announcement that the Opposition will hotly contest the Bill, Sir Earle Page, member of the War Advisory Committee, said that delay and uncertainty must result from the Government's plan because the constitutional issue would undoubtedly be decided by the courts. Defending the Government's proposal Mr. J. J. Daly said that the British people had just returned a Government pledged to nationalisation plans far more advanced than those of Australia. It was therefore fitting that at this moment Australia should be debating a measure which signified Australian unity with the British people in the search for a new and better way of life.



"Anybody else for Paddington or Edgware Road?"

P.I.C.A.O.

THE Secretariat of the new Provisional International Civil Aviation Organisation, the seat of which will be in Montreal, will offer a number of employment opportunities for qualified personnel, announces the Canadian External Affairs Department.

Personnel will be required to be skilled in the technical specialities of aircraft airworthiness, qualifications and licensing of operating personnel, organisation of air routes and related subjects such as wireless, communications, air traffic control, meteorology and air mapping.

Persons seeking employment with "P.I.C.A.O." should communicate with the Canadian Preparatory Committee, Room 1212, Dominions Square Buildings, Montreal.

PACIFIC SERVICE

LANDPLANES will replace flying boats on the San Francisco-New Zealand service which Pan American Airways hope to resume in the near future.

The route will be much the same as that followed before the interruption of the service by the Pacific war but flying time would be 36 hours and the fare $292 (£73) plus any Government travel tax. This is less than first class steam fare.

The machines with which the service is to be operated will be either the DC-7s or Lockheed Constellations. The former are powered with four engines of 3,000 h.p. each, develop a cruising speed of 300 m.p.h., and carry 100 passengers in addition to mail baggage and express freight. Constellations carry 60 passengers.

Some time will, however, elapse before the DC-7s are used, as they are not likely to be available before the middle of next year, and until then smaller machines are to be put into service.

FACILITIES AT NEW YORK

BRITISH air lines will be allotted space at the Idlewild airport, Long Island, New York, which the city is constructing on the shores of Jamaica Bay at a cost of £40,000,000. This decision marks the conclusion of two years of negotiations, and places at British disposal space at least sufficient for transatlantic service facilities.

Altogether 38 "gate positions" each 150ft. wide and including separate customs and passport offices have been allocated. Of these 31 go to American air lines and seven to foreign operators, of which Britain receives two.

The future use of Idlewild as the terminal for British transatlantic services would bring them within easier reach of New York. At present the rail journey from the marine base at Baltimore where B.O.A.C. flying boats anchor, takes 2½ hours as compared with half an hour car journey from Idlewild to New York. The use of Idlewild, however, would imply a change over to land machines, but such a move will only become topical in about two years when the airport is completed.

B.O.A.C. APPOINTMENTS

CONGRATULATIONS to B.O.A.C. Capts. Alger, Bailey, Harrington and Mollard in their new appointments.

Captain R. P. Mollard has been appointed manager No. 8 Line, Durban. He has logged some 13,000 hours, flown practically all types of aircraft, was co-pilot on the first experimental air mail service to Australia in 1931, and was commended in the Honours List, January, 1945. Capt. J. C. Harrington, O.B.E., who goes to Hurn as manager, No. 2 Line, has been with flying boats since 1937 and flew in 1940 the first flying boat on survey through the Belgian Congo. Capt. F. Bailey, appointed operations superintendent Middle East Region, joined Imperial Airways in 1924 and made a world's record on the Brindisi-Alexandria sector by flying 4,500 hours on one aircraft. He piloted *Canopus* on her maiden flight in 1936. Capt. H. W. C. Alger, appointed manager, No. 4 Line, Poole, has completed over 14,000 flying hours and had considerable experience since 1928 on different sectors of Empire operations. Among these he piloted the DH-66 *City of Cairo* on the Capetown survey, and the Short Kent *Satyrus* in 1937 on the Singapore survey.

The new appointments follow the Corporation's policy of transferring senior captains who have shown exceptional technical and administrative abilities to executive positions concerned with flying operations.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

THE SHAPE OF THINGS TO COME

Danger in Two-control "Safety"

I HAVE been having arguments with colleagues as to the desirability of simplified aircraft controls, e.g., two-surface control instead of three, and my contention is that, whilst measures of simplification appear at first sight to be attractive, unless very well done indeed are likely to be a danger.

To support this view, I contend that the pilot who has learnt to fly on, say, a Tiger Moth might well be a perfectly safe and competent pilot of a "safe" two-control aircraft, but the man who learns to fly on the latter type is unfitted to handle conventional controls. Again, as I see it, two-control types will have limitations of manœuvre where, ordinarily, crossed controls would be used, and under these circumstances could easily find themselves in conditions where the "safety measure" was a severely limiting obstacle to winning free with a whole skin.

So long as straightforward flight from A to B is envisaged, all well and good, but I submit that immediately this narrow path is forsaken (and sometimes it is unavoidable), then the very advanced, super-scientific "safe" aircraft is infinitely less safe than the orthodox machine. Perhaps some other readers will air their views on this matter. RUFUS CARMODY.

WHAT DOES THE PRIVATE OWNER WANT?

A Single-engined Four-seater and a Twin-engined Six-seater

IN replying to Indicator's question (*Flight*, July 12th), I found it difficult not to start off, like Mr. Joad, by saying "It all depends on what you mean by a private owner."

To my mind, a private owner can be:

(1) The amateur who learns to fly and is content to keep an aircraft at an airfield and fly it about mostly on week-ends and summer evenings, with little more motive other than letting off steam and giving his friends occasional flips (or frights).

(2) The enthusiast who takes flying as a serious hobby, tours abroad and uses his aircraft as a means of getting from A to B, where there is a definite motive at B.

(3) The owner who combines (2) above with his business and possibly a certain amount of charter work.

I don't feel any useful purpose would be served in dealing with an aircraft for (1) above, as any good trainer type will do, but (2) and (3) both seem to me best served by a single-engined aircraft such as the Stinson Reliant, Heston Phœnix or Percival Gull, or a twin such as the D.H. Dragonfly or Rapide, Percival Q.6, and the Lockheed "12."

I don't consider that any of the above aircraft really meet post-war requirements except possibly the Stinson Reliant and the Lockheed "12," both of which were comparatively expensive in capital outlay.

What I feel is required is sufficient speed range to maintain an absolute minimum 150 m.p.h. against any normal head wind; a motor car finish inside; adequate luggage accommodation for four people with the single-engined type and six for the twin-engined type; full blind-flying equipment; radio installations to meet all legal requirements and to enable the aircraft to be flown in comfort with the minimum traffic restrictions; a range of 600 miles in still air; full night-flying equipment; and self-starters for the engines.

Arrangements should be made whereby, so far as possible, inspection of all working parts within the fuselage, wings and engine can be undertaken without removing cowlings or cutting fabric (in other words, free use of the zipp fastener and quickly detachable cover-plate), and a very detailed study made, on the part of the designer, with a view to low maintenance and cost of C. of A.

The only other type of aircraft for which I would have any use would be a 200 m.p.h. side-by-side two-seater, with a range of about 500 miles and week-end luggage accommodation; but it is open to doubt as to whether such a type, which could not have the full quota of navigational aids, would be allowed the freedom of movement, geographically, for its full benefit to be appreciated.

In setting out the above very brief requirements, I appreciate that many obvious details, some of which are a matter of personal choice, have been left out.

I have considered that the private owner's aircraft is most likely to be a four-seater, or slightly larger, on the assumption that there will be few private owners, other than the very rich, who will be able, for the next ten years, to afford to fly their own aircraft without they combine it with business, and thus recover a large percentage of their overheads. That is why I have also put a small, high-speed aircraft in rather as an afterthought. It has a limited business application, and is merely the rich amateur's sports car of the air.

While on this point, and in view of what I have said above, it has got to be made more easy for the private owner to obtain a "B" licence, or its post-war equivalent, so that he will be able partly to commercialise his flying. It is to be hoped that C.M.E. or its equivalent will appreciate that the safe and competent pilot can be found as much by a study of his past record, *practical* experience and ability, as by finding what sort of a squint he has, or what is his lung capacity, and the shape of his nostrils. Many of these physical "defects" can either be ignored or rectified. J. R. BRYANS.

IMPROVING THE BREED

"Indicator" Replies to "Technician"

SINCE we are both concerned with exactly the same thing—the improvement of design with the least possible wastage of time and effort—I would not have replied to "Technician's" views (July 26) were it not for the fact that he appears to have mistaken the real object of my arguments.

First of all, it is just the ballyhoo surrounding the glamorous and heroic (and quite imaginary) test pilot that we all want to lose so that we can proceed unhampered with the business of the day. The idea of the experimental test pilot as a man who, trailing an open parachute, staggers into the chief designer's office, hands in his report and staggers out to the local for refreshment is still, I regret, resting lightly in the minds of many of those who do the hard work.

In my article of May 3rd I suggested a way in which the undeniable gulf between theory and practice might be bridged. Maybe it would be more practical to do it, as "Technician" suggests, the other way round. But I don't think so. A test pilot, in order to understand exactly what is going on, does not need the particular experience and training required by the designer to do his work; he needs only to be very well-groomed in the more practical aspects of aerodynamic theory. His "little learning" (and much practical experience of cause and effect) would be duly converted by the design staff into formulæ. One doesn't need mathematical training to understand compressibility effects, or, to cite simple examples, the reason why metal-covered control surfaces are so much lighter than fabric-covered versions, or why tail-buffeting may occur when, for instance, there is a badly fitting panel in the wing-root fillet. But one needs to know what the air is doing. On the other hand, the technician would require a great deal more even than the trained ability to fly successive modern types with safety and skill for his opinion on flying characteristics to be of any value to him in his work. Certainly a few hours on training types would put him firmly in the category of those to whom a "little learning is a dangerous thing."

Of course, the technicians must take their share of the credit for the excellent characteristics of most present-day aircraft. But to whom must go the *discredit* for the few aircraft, produced on both sides of the Atlantic, which have been very far from good? I blame the technicians and the test pilots equally; both should have known better. But the technician is helpless if he is not backed by a really intelligent and imaginative test pilot. If the test pilots concerned with the development of one type which comes to my mind had been able (or been allowed) to produce something more than a set of facts and figures, a great deal of time and some valuable lives would have been saved. In another case, a "not-so-brainy" test pilot assisted a no-doubt very excellent and brainy designer to produce an aircraft which was almost completely unacceptable in its original form. The designer could know no better; all he needed was a test pilot with enough experience to know what was wanted and whose "preconceived theories" of how an aircraft should behave were sound.

Both edges of the sword must be equally sharp. At the moment, I feel, the test pilot's edge could, with good effect, be sharper. "INDICATOR."

TEN KNOTS FOR 1070 MILES: A photograph, just released by the Admiralty, of the aircraft carrier H.M.S. *Nabob* limping home last August after having been torpedoed during an action.

SERVICE AVIATION

Royal Air Force and Naval Air Arm News and Announcements

Appointments

THE Air Ministry announces the following R.A.F. appointments in the British Air Forces of Occupation (Germany):—

Air Vice-Marshal Frank Linden HOPPS, C.B., C.B.E., A.F.C., to be Air Officer-in-Charge of Administration.

Air Vice-Marshal Charles Ronald STEELE, C.B., D.F.C., to be Senior Air Staff Officer.

Air Vice-Marshal Anthony Lauderdale PAXTON, D.F.C., to be Air Officer Commanding No. 85 Group.

Air Commodore Percy Eric MAITLAND, C.B., M.V.O., A.F.C., to be Air Officer Commanding No. 2 Group and to be Acting Air Vice-Marshal.

NOTES ON CAREERS.

Air Vice-Marshal Hopps has been Air Officer Commanding No. 16 Group Coastal Command since July, 1943, and was previously Deputy Senior Air Staff Officer at Headquarters, Coastal Command. Before that he had been Senior Air Staff Officer at a number of Coastal Groups.

In 1920 he was at the Royal Aircraft Establishment, Farnborough, in the Experimental Section, and the following year took a course at the School of Naval Co-operation, subsequently serving at Calshot on flying duties. After an Air Defence Course at the Royal Air Force Staff College in 1929, he served with No. 99 Squadron, A.D.G.B., and in 1930 went to Singapore.

Following his return to England in 1934 he served in the Air Ministry on Intelligence duties, and in 1937 commanded No. 115 Squadron. In the following year he became an instructor at the R.A.F. Staff College. In August, 1939, he was at Headquarters, Coastal Command, and in 1940 commanded R.A.F. Station, Detling.

Air Vice-Marshal Steele has been Air Officer Commanding a Group in 2nd Tactical Air Force since the formation of that Command in 1944. He was previously A.O.C. a Fighter Group, and in 1943 was at Headquarters, Fighter Command on Air Staff Operations duties.

At the outbreak of war Air Vice-Marshal Steele was on Air Staff duties at a Bomber Command Group, and in January, 1940, was appointed to a similar post at Headquarters, British Air Forces, France. Later in the year he was appointed Senior Air Staff Officer to the Southern Rhodesian Air Force. Upon his return to England in 1942 he became Senior Air Staff Officer of a Fighter Command Group.

Air Vice-Marshal Paxton has been Senior Air Staff Officer, H.Q., Flying Training Command, since September, 1943. For two years previously he was on loan to the Canadian Government as Deputy Director of Flying Training, H.Q., R.C.A.F., and in 1940 he was S.A.S.O. No. 21 Flying Training Group.

He was commissioned in the R.F.C. in 1917, after entering the Service as a cadet earlier in the year, and served in France. Following the war he was posted to the Middle East for flying duties and was awarded the D.F.C. for operations in Mesopotamia in 1921.

After commanding Nos. 23 and 25 Squadrons he again went to the Middle East, and in 1936 became Chief Flying Instructor at the C.F.S.

Air Vice-Marshal Maitland has been Director of Operational Training, Air Ministry, since February, 1943, having previously been A.O.C. of a Group in Bomber Command. In March, 1941, he was appointed to command R.A.F. Station, Harwell, after commanding No. 15 Flying Training School from May, 1939.

He joined the Royal Navy in 1913, and was commissioned in the Royal Naval Air Service in 1915. In 1932 he graduated at the R.A.F. Staff College, A.D.G.B., and in December of that year was posted to Headquarters, A.D.G.B. In August, 1934, he commanded No. 207 Bomber Squadron (A.D.G.B.) and later commanded R.A.F. Station, Mount Batten. In 1937 he was appointed to command No. 205 Squadron, Far East.

Awards

THE KING has been graciously pleased to approve the following awards in recognition of gallantry and devotion to duty in the execution of air operations:—

Distinguished Service Order

Act. Wing Cdr. J. E. GRINDON, R.A.F., No. 630 Sqn.—In the course of numerous operational sorties, Wing Cdr. Grindon has established an excellent reputation for leadership, energy and courage. The worst weather or the heaviest opposition have never deterred him from the accurate completion of his allotted tasks. Over such heavily defended targets as Königsberg, Bremen and Bergen he has braved intense anti-aircraft fire and, despite damage to his aircraft on more than one occasion, has always fulfilled his mission. On one occasion, during a daylight attack on Homberg, severe damage was sustained and his aircraft became difficult to control but, in spite of the danger, Wing Cdr. Grindon continued to lead his formation with skill and determination. He has, at all times, set an outstanding example.

Act. Wing Cdr. N. G. MACFARLANE, R.A.F., No. 15 Sqn.—Since assuming command of his squadron, this officer has consistently displayed a high standard of leadership and devotion to duty. He has frequently led the squadron to attack distant and dangerous targets in enemy territory, undeterred by adverse weather and enemy opposition. On many of his missions, Wing Cdr. Macfarlane has acted as captain of aircraft with crews who were flying on their first operation. By his courage and experience he has been a source of confidence to all who serve under him. The high level of achievement attained by the squadron has been largely attributable to the fine qualities of its commander.

Sqn. Ldr. R. A. NEWMARCH, R.A.F.V.R., No. 44 Sqn.—Sqn. Ldr. Newmarch has completed numerous operational sorties, many of them attacks on distant and heavily defended targets in Germany. Every one of these attacks has been pressed home with great determination and efficiency and all have been successful, often in the face of difficult circumstances. On one occasion over Chapellerault, he drove off a determined attack by a Messerschmitt 110, while circling the target prior to making his bombing run. Sqn. Ldr. Newmarch, as squadron commander, has displayed outstanding devotion to duty, and his gallant leadership and untiring determination have set a fine example to all under his command.

Act. Sqn. Ldr. N. F. HILDYARD, D.F.C., R.A.F.V.R., No. 105 Sqn.—This officer has completed three outstanding tours of operational duty. In the early part of his third tour he was engaged in attacking vital targets in France immediately after the invasion. Since then he has taken part in missions against a large number of important centres in Germany, such as Dortmund, Cologne, Nuremberg and Munster. Throughout all these operations, Sqn. Ldr. Hildyard has displayed outstanding courage and great skill as a pilot. His determination to press home his attacks has been exceptional and he has successfully completed many missions in most arduous circumstances and in the face of very heavy enemy opposition.

Flt. Lt. D. C. DAVIES, D.F.C., R.A.F.V.R., No. 139 Sqn.—This officer has an outstanding record of operational sorties. He has completed three

SERVICE AVIATION

tours of operational duty. Since the award of the D.F.C., Flt. Lt. Davies has always displayed exceptional courage and ability. On 13 occasions he has attacked Berlin and, in addition, has encountered fierce opposition over most of the major targets in Germany. He has rendered valuable service to his squadron.

Act. Flt. Lt. W. J. CLELAND, D.F.C., R.A.F.V.R., No. 156 Sqn.—This officer has always displayed a fine fighting spirit and a great zest for operations. He has a fine record of operational sorties and has always shown outstanding courage and determination, even in the face of the heaviest opposition. Many of his missions have entailed the fulfilment of difficult and dangerous duties. He has invariably performed them with great gallantry and efficiency. Flt. Lt. Cleland has always set a high standard of tenacity and devotion to duty.

Act. Flt. Lt. J. CUTHILL, D.F.C., R.A.F.V.R., No. 156 Sqn.—Flt. Lt. Cuthill has taken part in many hazardous missions against the enemy. His fine leadership and efficiency have extricated his crew and aircraft from many perilous situations. He has operated frequently over some of the most heavily defended objectives in Germany, including Berlin, Leipzig and Schweinfurt. By his unfailing courage, endurance and determination, this officer has proved himself a most valuable asset to his squadron.

Act. Sqn. Ldr. J. B. BURT, D.F.C., R.A.F.V.R., No. 109 Sqn.—Sqn. Ldr. Burt has an impressive operational record. He has successfully participated in numerous attacks against heavily defended German targets, including industrial centres in the Ruhr, and many vital industrial targets, having on several occasions flown the leading aircraft in formation attacks. On a number of sorties his aircraft has been damaged by anti-aircraft fire. In March, 1945, he led a formation of bombers against enemy mechanical transport in the Wesel area. Adverse weather was encountered, but despite this, owing to Sqn. Ldr. Burt's skill and tenacity, a successful attack was accomplished. His outstanding qualities of leadership, both in the air and on the ground, have done much to maintain the high standard of achievement in his squadron.

Act. Sqn. Ldr. R. E. CURTIS, D.F.C., R.A.F.V.R., No. 109 Sqn.—This officer has a distinguished record of operational flying. He has completed three tours of operational duty and since the award of the D.F.C. he has participated in numerous attacks on important and heavily defended targets in Germany. He is a navigator of outstanding ability who has materially contributed to the high standard of operational efficiency maintained in his squadron. At all times Sqn. Ldr. Curtis has displayed meticulous care in the preparation and assessment of charts and logs for operational flights and courage and devotion to duty of the highest order.

Act. Sqn. Ldr. F. G. DAVY, D.F.C., R.A.F.V.R., No. 109 Sqn.—Sqn. Ldr. Davy has shown himself to be a navigator of the utmost reliability. He has always devoted himself with conscientiousness and tenacity to the task and has invariably displayed high skill and great courage. On all of his missions excellent results have been obtained. Flt. Lt. Davy's high sense of duty, ability and determination have been a valuable asset to his squadron.

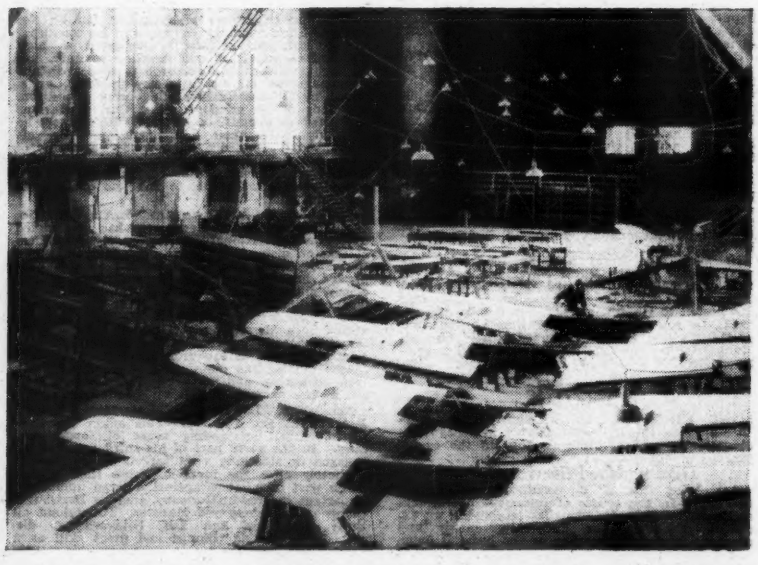
Act. Sqn. Ldr. J. F. C. GALLAHER, D.F.C., R.A.F.V.R., No. 105 Sqn.—Sqn. Ldr. Gallaher is now engaged on his third tour of operational duties and has completed a very large number of sorties, many of them in a most responsible role. In the earlier part of his present tour Sqn. Ldr. Gallaher completed many attacks on targets important for the invasion operations. Since then he has taken part in many sorties against targets in the Ruhr valley and other heavily defended objectives in Germany. He has invariably displayed the utmost courage and skill and has proved himself an outstanding navigator.

Act. Sqn. Ldr. W. J. GREGORY, D.F.C., D.F.M., R.A.F.V.R.—Since being recommended for a bar to the D.F.C., this officer has taken part in many operational missions over enemy territory, in the course of which he participated in the destruction of eight enemy aircraft. Whilst supporting an attack on Cologne his aircraft was damaged by enemy fighters, the port engine being set on fire. By his skill as a navigator, Sqn. Ldr. Gregory enabled his pilot to avoid the persistent attacks of the enemy aircraft and assisted him during the return flight. On another occasion he and his pilot engaged two enemy fighters in a combat which lasted 25 minutes, destroying one of the enemy. In May, 1944, Sqn. Ldr. Gregory assisted his pilot to destroy a Focke Wulf 190 while returning from a sortie against Aalborg. Shortly afterwards, the aircraft was severely damaged by a Messerschmitt 109. With their petrol draining rapidly from the damaged tanks, they attempted flying the aircraft to base, but were forced down on the North Sea and rescued after 30 minutes by a naval vessel. For the past seven months this officer has fulfilled the duties of Station Navigation Officer, in which capacity his experience and advice have been most valuable.

Wing Cdr. A. N. FRANCOMBE, R.A.F., No. 267 Sqn.—This officer has a fine record of operational flying. Since he assumed command his squadron has been chiefly engaged in operations over the Balkans and Northern Italy. Numerous hazardous and skilfully executed flights have been completed. Wing Cdr. Francombe has shown himself to be a most conscientious, thorough and courageous leader. He has always set an inspiring example which has largely contributed to the fine work achieved by his squadron.

Act. Wing Cdr. T. A. COX, R.A.F.O., No. 180 Sqn.—This officer has served in both the Far Eastern and European theatres of war. Since February, 1945, he has proved to be an excellent squadron commander, who by his outstanding leadership, energy and drive, has maintained his unit at a high standard of efficiency, enabling it to achieve, amongst other highly successful attacks, three which were outstanding. These were an attack on a strong point at Bremen in April, 1945, and two attacks on the barracks at Oldenberg. Wing Cdr. Cox has led numerous attacks against heavily defended targets, always displaying great skill, determination and devotion to duty.

Act. Wing Cdr. J. H. SINDALL, R.A.F.O., No. 215 Sqn.—This officer has served in both the European and Far Eastern theatres of war. During his first tour of duty he attacked many of the most heavily defended targets in Germany. Now on his second tour of operational duty, he has taken part in many sorties against targets in Burma and on numerous supply dropping operations. Many of these missions have involved flying over difficult terrain in adverse weather. Wing Cdr. Sindall has, at all times, displayed outstanding organising ability and great devotion to duty. He has led his squadron on many low level daylight attacks against the enemy's lines of communication and rolling stock, and has always pressed home his attacks with skill, courage and determination.



ANY AIRPORT IN A STORM: The bricked-up main entrance hall of the Tempelhof airport, Berlin, which had been converted into a wing building shop for Fw. 190s. Two assembly lines were laid out in a subterranean passage beneath the buildings.

(Left) Badge of No. 812 Squadron, Naval Air Arm. "Dex Aie" (God aid). On a blue field, over water, wavy green, a flying fish, gold. (Right) Badge of No. 813 Squadron, Naval Air Arm. "Full sails." On a white field, over water in base, barry wavy blue and white, an eagle displayed reversed, black.

Bar to Distinguished Flying Cross

Act. Group Capt. J. B. VOYCE, D.F.C., R.A.F., No. 139 Sqn.
Act. Sqn. Ldr. A. COLEMAN, D.F.C., R.A.F.V.R., No. 139 Sqn.
Act. Sqn. Ldr. B. W. LE SUEUR, D.F.C., R.A.F.V.R., No. 105 Sqn.
Act. Sqn. Ldr. G. A. STOCKS, D.F.C., R.A.F.V.R., No. 7 Sqn.

Distinguished Flying Cross

Flt. Lt. J. M. WALLACE, R.C.A.F., No. 432 (R.C.A.F.) Sqn.
Capt. R. A. GEATER, S.A.A.F., No. 19 (S.A.A.F.) Sqn.
Flt. Lt. J. C. E. ATKINS, R.A.F.V.R., No. 219 Sqn.
F/O. D. R. MAYO, R.A.F.V.R., No. 219 Sqn.
F/O. H. BENSON, R.A.F.V.R., No. 156 Sqn.
F/O. T. CONNER, R.A.F.V.R., No. 57 Sqn.
F/O. D. H. SWAIN, R.A.A.F., No. 128 Sqn.
W/O. W. J. HODGES, R.A.F.V.R., No. 174 Sqn.
F/O. F. R. WALKER, R.A.F.V.R., No. 184 Sqn.
P/O. T. F. TAYLOR, R.A.F.V.R., No. 488 (N.Z.) Sqn.
Flt. Lt. H. F. MCNABB, Flt. Lt. L. WATERFIELD,
F/O. R. W. BOWHAY, R.C.A.F., No. 408 (R.C.A.F.) Sqn.
F/O. B. L BRADY, R.C.A.F., No. 424 (R.C.A.F.) Sqn.
F/O. D. S. BROWN, R.C.A.F., No. 10 Sqn.
F/O. G. F. BUTTERWICK, R.C.A.F., No. 166 Sqn.
F/O. W. R. CAMPBELL, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
F/O. E. S. CHAMBERS, R.C.A.F., No. 166 Sqn.
F/O. P. J. CORMIER, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
F/O. L. S. CRUIKSHANK, R.C.A.F., No. 434 (R.C.A.F.) Sqn.
F/O. W. F. DIX, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
F/O. F. C. FALLON, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
F/O. W. H. FORD, R.C.A.F., No. 166 Sqn.
F/O. G. L. GILBERT, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
F/O. F. B. GORDON, R.C.A.F., No. 424 (R.C.A.F.) Sqn.
F/O. D. L. HAGAR, R.C.A.F., No. 431 (R.C.A.F.) Sqn.
F/O. L. G. HANLEY, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
F/O. R. G. HARVEY, R.C.A.F., No. 582 Sqn.
F/O. M. HARVIE, R.C.A.F., No. 434 (R.C.A.F.) Sqn
F/O. J. A. HEMSLEY, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
F/O. W. C HENDERSON, R.C.A.F., No. 432 (R.C.A.F.) Sqn.
F/O. R. F. HUBLEY, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
F/O. W. HUNKA, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
F/O. P. F. HUNT, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
F/O J. M. JACKMAN, R.C.A.F., No. 424 (R.C.A.F.) Sqn.
F/O. E. R JACKSON, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
F/O. R. E. JOHNSON, R.C.A.F., No. 408 (R.C.A.F.) Sqn.
F/O. W. A. JOHNSON, R.C.A.F., No. 102 Sqn.
Act. Flt. Lt. S. C. JOSLING, R.A.F.V.R., No. 195 Sqn.
Act. Flt. Lt. D. J. LANGLEY, D.F.M , R.A.F.V.R., No. 405 (R.C.A.F.) Sqn.
Act. Flt. Lt. J. T. LANGRAN, R.A.F.V.R., No. 77 Sqn.

Act. Flt. Lt. H. W. THOMSON, R.A.F.V.R., No. 7 Sqn.
F/O. N. H. ALTY, R.A.F.V.R., No. 49 Sqn.
F/O. W. BALL, R.A.F.V.R., No. 571 Sqn.
F/O. C. F. BEYER, R.A.F.V.R., No. 170 Sqn.
F/O. J. G. CALVERT, R.A.F.V.R., No. 640 Sqn.
F/O. J. W. CANNON, R.A.F.V.R., No. 49 Sqn.
F/O. A. B. COOK, R.A.F.V.R., No. 10 Sqn.
F/O. C. D. BURTON, R.A.F.V.R., No. 16 Sqn.
F/O. D. G. J. HIGGS, R.A.F.V.R., No. 101 Sqn. (since deceased).
Flt. Lt. H. K. HUGHES, R.A.F.V.R., No. 3 Sqn.
Flt. Lt. A. T. KIRK, R.A.F., No. 140 Sqn.
Flt. Lt. A. H. J. SAMBIDGE, R.A.F.V.R., No. 83 Sqn. (since deceased).
Flt. Lt. W. L. SAUNDERS-KNOX-GORE, R.A.F.V.R., No. 13 Sqn. (since deceased).
Flt. Lt. L. R. G. SMITH, R.A.F.V.R., No. 80 Sqn
Act. Flt. Lt. R. CREASE, R.A.F.V.R., No. 7 Sqn. (since deceased).
F/O. F. C. H. JOHNS, R.A.F.V.R., No. 515 Sqn. (since deceased).
F/O. W. G. E. F. WALTON, B.E.M., R.A.F.V.R., No. 138 Sqn. (since deceased).
F/O. F. H. C. WHEATCROFT, R.A.F.V.R., No. 184 Sqn.
Act. F/O. A. V. H. WARDLE, R.A.F.V.R., No. 57 Sqn. (since deceased).
P/O. H. W. BACON, R.A.F.V.R., No. 7 Sqn.
P/O. W. CURRIE, R.A.F.V.R., No. 7 Sqn. (since deceased).
P/O. G. W. DOPSON, R.A.F.V.R., No. 80 Sqn.
Flt. Lt. R. E. CHARLTON, D.F.M., R.A.F., No. 575 Sqn.
Flt. Lt. R. A. DAVIS, R.A.F.V.R., No. 512 Sqn.
Flt. Lt. R. R. C. HYNE, R.A.A.F., No. 233 Sqn.
Flt. Lt. P. W. SMITH, R.A.F.V.R., No. 48 Sqn.
Flt. Lt. J. WILLIAMS, A.F.C., R.A.F.V.R., No. 512 Sqn.
F/O. F. J. ANDREWS, R.C.A.F., No. 437 Sqn.
F/O. J. MacE. BYRNES, R.C.A.F., No. 437 (R.C.A.F.) Sqn.
F/O. F. A. PRIOR, R.A.F., No. 575 Sqn.
F/O. R. S. PURKIS, R.C.A.F., No. 437 (R.C.A.F.) Sqn.
P/O. R. S. E. VERRAN, R.A.F.V.R., No. 80 Sqn.
P/O. H. J. WATKINS, R.A.F.V.R., No. 625 Sqn. (since deceased).
P/O. F. E. WHEELER, R.A.F.V.R., No. 174 Sqn.
P/O. W. J. WILLSHAW, R.A.F.V.R., No. 16 Sqn.
P/O. T. WRIGHT, R.A.F.V.R., No. 101 Sqn. (since deceased).
W/O. D. GRIMLEY, R.A.F.V.R., No. 49 Sqn.
W/O. R. H. WEBB, R.A.F.V.R., No. 175 Sqn.
F/O. J. E. SEABY, No. 437 (R.C.A.F.) Sqn.
F/O. G. S. WRIGHT, R.A.F.V.R., No. 233 Sqn.
P/O. N. A. E. MILLS, R.A.F.V.R., No. 233 Sqn
W/O. (now P/O.) H. FABBAR, R.A.F., No 271 Sqn.
W/O. J. H. COLTON, R.A.F.V.R., No. 48 Sqn.
F/O. P. J SPELLMAN, R.A.F.V.R., No. 182 Sqn.
Act. Sqn. Ldr. P. A. CLARKE, R.A.F., No. 512 Sqn
Act. Sqn. Ldr: R. D. DANIELL, A.F.C., R.A.F., No. 233 Sqn.
Act. Sqn. Ldr. J. T. REED, R.C.A.F., No. 437 (R.C.A.F.) Sqn.
Flt. Lt. J. W. ATKIN, R.A.F.V.R., No. 575 Sqn.
Flt. Lt. A. W. BROWNE, R.C.A.F., No. 550 Sqn.
Flt. Lt. P. M. FORSTER, R.A.F.V.R., No. 112 Sqn.
F/O. B. B. GRAY, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
Capt. A. M. COOKE, S.A.A.F., No. 245 Sqn.
F/O. G. F. REED, R.N.Z.A.F., No. 219 Sqn.
F/O. R. BRICKER, R.A.F.V.R., No. 219 Sqn.
F/O. H. L. JONES, R.C.A.F., No. 408 (R.C.A.F.) Sqn.
F/O. T. R. C. KELLY, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
F/O. W. G. KINGSTON, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
F/O. G. R. KIRBY, R.C.A.F., No. 427 (R.C.A.F.) Sqn.
F/O. E. R. KNOX-LEET, R.C.A.F., No 405 (R.C.A.F.) Sqn.
F/O. L. J. LAVALLEE, R.C.A.F., No. 425 (R.C.A.F.) Sqn.
F/O. W. H. K. MACDONALD, R.C.A.F., No. 420 (R.C.A.F.) Sqn.
F/O. D. McK. OLDERSHAW, R.C.A.F., No 408 (R.C.A.F.) Sqn.

(Left) Badge of No. 820 Squadron, Naval Air Arm. (Motto not yet decided.) On a white field, over two bars wavy in base, a flying fish, blue. (Right) Badge of No. 898 Squadron, Naval Air Arm. "Far and Wide." On a blue field, a sun in splendour, gold, charged with a flying fish, black.

R.A.F. TRAINING MISSION IN CHINA; Valuable aid is being given to China by an R.A.F. Training Mission headed by Air Vice-Marshal W. F. MacNeece Foster, C.B., C.B.E., D.S.O., D.F.C. Left to right (back row): Wing Commander R. S. Allen, D.S.O., D.F.C.; Group Captain E. A. Douglas Jones; Dr. Shih, Secretary to the Governor of Szechwan Province; Colonel Hu, Deputy Commandant of the Chinese Air Force Staff College; Group Captain E. S. Burns, Deputy Head of the R.A.F. Training Mission; Wing Commander A. C. Parnall and Flt. Lt. P. A. Long. (Front row): Mrs. Wang: H.E. General Chang Chun, Governor of Szechwan Province; Air Vice-Marshal W. F. MacNeece Foster, C.B., C.B.E., D.S.O., D.F.C., Head of the R.A.F. Training Mission; Colonel S. M. Wang, Commandant of the Chinese Air Force Staff College and Mrs. Shih.

F/O. J. E. J. PAGE, R.C.A.F., No. 425 (R.C.A.F.) Sqn.
F/O. G. L. SCOTT, R.C.A.F., No. 608 Sqn.
F/O. J. R. THACKERAY, R.C.A.F., No. 427 (R.C.A.F.) Sqn.
F/O. R. C. WEBSTER, R.C.A.F., No. 10 Sqn
F/O. C. D. F. WILLIAMS, R.C.A.F., No. 419 (R.C.A.F.) Sqn.
F/O. S. G. WRIGHT, R.C.A.F., No. 514 Sqn.
Act. F/O. I. REBICK, R.C.A.F., No. 10 Sqn.
P/O. W. R. CORNELL, R.C.A.F., No. 431 (R.C.A.F.) Sqn.
P/O. G. E. HUTTON, R.C.A.F., No 425 (R.C.A.F.) Sqn
P/O. L. J. JODRELL, R.C.A.F., No. 429 (R.C.A.F.) Sqn.
P/O. H. P. KUCZMA, R.C.A.F., No. 425 (R.C.A.F.) Sqn.
P/O. H. J. P. LOCKETT, R.C.A.F., No. 425 (R.C.A.F.) Sqn.
P/O. H. M. B. MILLWARD, R.C.A.F., No. 427 (R.C.A.F.) Sqn.
P/O. S. E. MORRIS, R.C.A.F., No. 415 (R.C.A.F.) Sqn.
Act. Sqn. Ldr. J. D. ROBINS, R.N.Z.A.F., No. 139 Sqn.
Flt. Lt. J. L. DE BEER, R.N.Z.A.F., No. 105 Sqn.
Flt. Lt. J. SHAW, R.N.Z.A.F., No. 571 Sqn.
Act. Flt. Lt. B. BENNETTS, R.N.Z.A.F., No. 153 Sqn.
Act Flt. Lt. E. KING, R.N.Z.A.F., No. 170 Sqn
Act. Flt. Lt. F. E. PREBBLE, R.N.Z.A.F., No. 635 Sqn.
Act. Flt. Lt. G H. TURNER, R.N.Z.A.F., No. 170 Sqn.
P/O. J. F. L. R. POIRIER, R.C.A.F., No. 425 (R.C.A.F.) Sqn.
P/O. G. SUPERGIA, R.C.A.F., No. 431 (R.C.A.F.) Sqn.
Flt. Lt. R. B. T. FIELD, R.C.A.F., No. 420 (R.C.A.F.) Sqn.
Flt. Lt. T. J. MACKINNON, R.C.A.F., No. 425 (R.C.A.F.) Sqn.
Flt. Lt. W. A. T. WHITE, R.C.A.F., No. 626 Sqn.
Act. Flt. Lt. D. H. MACKIRDY, R.C.A.F., No. 158 Sqn.
Flt. Lt. M. R. BREED, R.N.Z.A.F., No. 109 Sqn.
Flt. Lt. J. E. MORTIMER, R.N.Z.A.F., No. 485 (R.N.Z.A.F.) Sqn.
Act. Flt. Lt. A. MUGGERIDGE, R.N.Z.A.F., No. 156 Sqn.
Act. Sqn. Ldr. W. C. TIMONEY, R.A.F.O., No. 464 (R.A.A.F.) Sqn.
Act. Sqn. Ldr. A. W. WATSON, R.A.F.V.R., No. 253 Sqn. (since deceased).
Flt. Lt. I. H. FRYER (Lt., Royal Tank Regiment), R.A.F., No. 4 Sqn.
Flt. Lt. P. J. HOUGHTON, R.A.F.V.R., No. 604 Sqn.
Flt. Lt. L. J. LEPPARD, R.A.F.V.R., No. 604 Sqn.
Act. Wing Cdr. J. D. R. FORBES, A.F.C., R.A.F., No. 77 Sqn.
Flt. Lt. R. F. ARCHAMBAULT, R.C.A.F., No. 425 (R.C.A.F.) Sqn.
Flt. Lt. C. B. BENTON, R.C.A.F., No. 426 (R.C.A.F.) Sqn.
Flt. Lt. A. C. DAVIES, R.C.A.F., No. 426 (R.C.A.F.) Sqn.
Flt. Lt. D C. GONYEA, R.C.A.F., No. 431 (R.C.A.F.) Sqn.
Flt. Lt. B. M. KAPLANSKY, R.C.A.F., No. 431 (R.C.A.F.) Sqn.
F/O. D. R. BLACK, R.C.A.F., No. 426 (R.C.A.F.) Sqn.
F/O. W. F. GRIFFITHS, R.C.A.F., No. 415 (R.C.A.F.) Sqn.
F/O. P. C. O'CONNOR, R.C.A.F., No. 426 (R.C.A.F.) Sqn.
P/O. B. H. JENSEN, R.C.A.F., No. 433 (R.C.A.F.) Sqn.
P/O. R. E. BAGNELL, R.C.A.F., No. 420 (R.C.A.F.) Sqn.
Act. F/O. J. H. T. WOOD, R.N.Z.A.F., No. 75 (N.Z.) Sqn.
Flt. Lt. L. W. DENTON, R.A.A.F., No. 460 (R.A.A.F.) Sqn.
Flt. Lt. R. C. HALKYARD, R.A.A.F., No. 7 Sqn.
Flt. Lt. J. B HALL, R.A.A.F., No 463 (RA.A.F.) Sqn.
Flt. Lt. C. W. RODGERS, R.A.A.F., No. 630 Sqn.
Wing Cdr. C. M. BLACK, R.C.A.F., No. 426 (R.C.A.F.) Sqn.
Act. Sqn. Ldr. J. F. ROBERTS, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
Flt. Lt. J. R. LAPORTE, R.C.A.F., No. 425 (R.C.A.F.) Sqn.
Flt. Lt. D. E. SILLERS, R.C.A.F., No. 424 (R.C.A.F.) Sqn.
Act. Flt. Lt. K. O. POWELL, R.C.A.F., No. 429 (R.C.A.F.) Sqn.
F/O. J. A. BRASSARD, R.C.A.F., No. 425 (R.C.A.F.) Sqn.
F/O. H. H. COWAN, R.C.A.F., No. 424 (R.C.A.F.) Sqn.
F/O. J. L. MOULD, R.C.A.F., No. 424 (R.C.A.F.) Sqn.
F/O. J. O. STEWART, R.C.A.F., No. 434 (R.C.A.F.) Sqn.
P/O. H. D. MILLSON, R.C.A.F., No. 433 (R.C.A.F.) Sqn.
Flt. Lt. D. W. TAYLOR, R.A.A.F., No. 635 Sqn.
Act. Flt. Lt. V. F. CAGE, R.A.A.F., No. 15 Sqn.
Act. Flt. Lt. P. E. CAWTHORNE, R.A.A.F., No. 635 Sqn.
Act. Flt. Lt. J. T. DOLLISSON, R.A.A.F., No. 15 Sqn.
Act. Flt. Lt. R. O. GEORGE, R.A.A.F., No. 582 Sqn.
Act. Flt. Lt. K. GOLDIE, R.A.A.F., No. 149 Sqn.
Act. Flt. Lt. D. D. MACDONALD, R.A.A.F.
Act Flt. Lt. L. H. MARRIOTT, R.A.A.F., No. 15 Sqn.
F/O. R. CASSIE, R.A.A.F., No. 460 (R.A.A.F.) Sqn.
F/O. C. J. COX, R.A.A.F., No. 467 (R.A.A.F.) Sqn.
F/O. V. C. GEIMMETT, R.A.A.F., No. 460 (R.A.A.F.) Sqn.
F/O. G. HANSEN, R.A.A.F., No. 77 Sqn.
F/O. H. HENDRICK, R.A.A.F., No. 460 (R.A.A.F.) Sqn.

Sqn. Ldr. R. COWANS, R.C.A.F., No. 426 (R.C.A.F.) Sqn.
Sqn. Ldr. J. PENNINGTON, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
Flt. Lt. O. H. AUSTENSON, R.C.A.F., No. 420 (R.C.A.F.) Sqn.
Flt. Lt. S. A. BASCOM, R.C.A.F., No. 420 (R.C.A.F.) Sqn.
Flt. Lt. C. S. BRADY, R.C.A.F., No. 434 (R.C.A.F.) Sqn.
Flt. Lt. W. C. CAMERON, R.C.A.F., No. 419 (R.C.A.F.) Sqn.
Flt. Lt. A. L. DYCK, R.C.A.F., No. 223 Sqn.
Flt. Lt. R. J. FAWCETT, R.C.A.F., No. 429 (R.C.A.F.) Sqn.
Flt. Lt. H. H. GOUCHEY, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
Flt. Lt. G. H. A. HALCRO, R.C.A.F., No. 434 (R.C.A.F.) Sqn.
Flt. Lt. H. S. HICKEN, R.C.A.F., No. 426 (R.C.A.F.) Sqn.
Flt. Lt. J. H. HOUSER, R.C.A.F., No. 425 (R.C.A.F.) Sqn.
Flt. Lt. C. G. MITCHELL, R.C.A.F., No. 35 Sqn.

Distinguished Flying Medal

Flt. Sgt. A. J. BATE, R.A.F.V.R., No. 12 Sqn.
Flt. Sgt. A. E. CAMLIN, R.A.F.V.R., No. 7 Sqn.
Flt. Sgt. J. W. CHEETHAM, R.A.F.V.R., No. 648 Sqn.
Flt. Sgt. S. P. CLIFFORD, R.A.F.V.R., No. 12 Sqn.
Flt. Sgt. S. J. HENDERSON, R.A.F., No. 617 Sqn.
Flt. Sgt. D. HUTTON, R.A.F.V.R., No. 93 Sqn.
Flt. Sgt. A. EXON, R.A.F.V.R., No. 114 Sqn.
Flt. Sgt. O. F. P. NORTON, R.A.F.V.R., No. 114 Sqn.
Flt. Sgt. C. H. C. ANTLETT, R.A.F., No. 354 Sqn.
Flt. Sgt. K. E. GLOVER, R.C.A.F., No. 635 Sqn.
Flt. Sgt. (now P/O.) A. S. BEAVIS, R.A.A.F., No. 608 Sqn.
Flt. Sgt. R. A. CALDWELL, R.A.A.F., No. 12 Sqn.
Flt. Sgt. (now P/O.) B. SPENCER, R.A.A.F., No. 626 Sqn.
Flt. Sgt. (now P/O.) T. ROMANCHUK, R.C.A.F., No. 403 (R.C.A.F.) Sqn.
Flt. Sgt. D. J. NELLIGAN, R.C.A.F. No. 428 (R.C.A.F.) Sqn.
Flt. Sgt. J. W. FISHER, R.C.A.F., No. 434 (R.C.A.F.) Sqn.
Flt. Sgt. J. W. G. HAMILTON, R.C.A.F., No. 626 Sqn.
Flt. Sgt. D. SHUTKA, R.C.A.F., No. 408 (R.C.A.F.) Sqn.
Flt. Sgt. W. J. G. COZENS, R.C.A.F., No. 424 (R.C.A.F.) Sqn.
Flt. Sgt. (now W/O.2) M. S. JOWETT, R.C.A.F., No. 431 (R.C.A.F.) Sqn.
Flt. Sgt. D. E. GWYNNE-VAUGHAN, R.C.A.F., No. 431 (R.C.A.F.) Sqn.
Flt. Sgt. (now P/O.) D. LeR. PHILLIPS, R.C.A.F., No. 166 Sqn.
Flt. Sgt. (now P/O.) F. G. K. SAUNDERS, R.C.A.F., No. 431 (R.C.A.F.) Sqn.
Flt. Sgt. J. P. RYAN, R.A.F.V.R., No. 51 Sqn.
Flt. Sgt. F. STEBBINGS, R.A.F.V.R., No. 9 Sqn.
Flt. Sgt. J. THORNTON, R.A.F.V.R., No. 625 Sqn.
Flt. Sgt. T. T. TURNBULL, R.A.F.V.R., No. 619 Sqn.
Flt. Sgt. J. R. WHITEHEAD, R.A.F.V.R., No. 97 Sqn.
Flt. Sgt. F. WHITFIELD, R.A.F.V.R., No. 9 Sqn.
Flt. Sgt. R. RICE, R.A.F.V.R., No. 608 Sqn.
Flt. Sgt. C. SAUNDERSON, R.A.F.V.R., No. 156 Sqn.
Flt. Sgt. A. SIMPSON, R.A.F.V.R., No. 625 Sqn.
Flt. Sgt. (now P/O.) W. A. STUART, R.A.F.V.R., No. 7 Sqn.
Flt. Sgt. (now P/O.) C. SUTTON, R.A.F.V.R., No. 77 Sqn.
Flt. Sgt. J. SWINDLEHURST, R.A.F.V.R., No. 514 Sqn.
Flt. Sgt. F. J. TEMPLEMAN, R.A.F.V.R., No. 149 Sqn.
Flt. Sgt. G. F. A. TIGAR, R.A.F.V.R., No. 153 Sqn.
Flt. Sgt. A. TREADWELL, R.A.F.V.R., No. 51 Sqn.
Flt. Sgt. G. E. J. TREMBLING, R.A.F.V.R., No. 51 Sqn.
Flt. Sgt. (now P/O.) J. H. VAN HOUTEN, R.A.F.V.R., No. 139 Sqn.
Flt. Sgt. L. A. WALKER, R.A.F.V.R., No. 218 Sqn.
Flt. Sgt. (now P/O.) G. B. WARD, R.A.F.V.R., No. 582 Sqn.
Flt. Sgt. J. WARD, R.A.F.V.R., No. 195 Sqn.
Flt. Sgt. G. A. WHEATCROFT, R.A.F.V.R., No. 571 Sqn.
Flt. Sgt. L. G. MORRIS, R.A.F.V.R., No. 51 Sqn.
Flt. Sgt. T. OGDEN, R.A.F.V.R., No. 35 Sqn.
Flt. Sgt. J. PARKINSON, R.A.F.V.R., No. 635 Sqn.
Flt. Sgt. G. E. PATTERSON, R.A.F.V.R., No. 635 Sqn.
Flt. Sgt. J. L. PEEL, R.A.F.V.R., No. 153 Sqn.
Act. Flt. Sgt. (now P/O.) G. W. BENNINGTON, R.A.F.V.R., No. 582 Sqn.
Flt. Sgt. K. L. LEAN, R.A.A.F., No. 7 Sqn.
Flt. Sgt. A. E. LOUDON, R.A.A.F., No. 12 Sqn.
Flt. Sgt. G. C. NEWTON, R.A.A.F., No. 626 Sqn.
Sgt. P. BATES, R.A.F.V.R., No. 166 Sqn.
Sgt. (now P/O.) L. M. CHRISTIE, R.A.F.V.R., No. 166 Sqn.
Flt. Sgt. (now P/O.) D. A. BOWER, R.C.A.F., No. 158 Sqn.
Flt. Sgt. (now P/O.) J. E. G. MARCIL, R.C.A.F., No. 425 (R.C.A.F.) Sqn.
Sgt. G. BINNS, R.A.F.V.R., No. 35 Sqn.
Sgt. H. J. EEBEN, R.A.F.V.R., No. 608 Sqn.
Sgt. J. D. GOLDWATER, R.A.F.V.R., No. 571 Sqn.
Sgt. C. HART, R.A.F.V.R., No. 163 Sqn.
Sgt. S. E. KANKA, R.A.F.V.R., No. 405 (R.C.A.F.) Sqn.
Sgt. K. O. McCALLUM, R.A.F.V.R., No. 77 Sqn.
Sgt. P. V. MEYER, R.A.F.V.R., No. 571 Sqn.
Sgt. J. W. MORGAN, R.A.F.V.R., No. 622 Sqn.
Sgt. F. L. WILLIAMS, R.A.F.V.R., No. 7 Sqn.
Sgt. A. T. WOOD, R.A.F.V.R., No. 692 Sqn.
Flt. Sgt. G. B. SMITH, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
Flt. Sgt. J. H. TAYLOR, R.C.A.F., No. 415 (R.C.A.F.) Sqn.
Flt. Sgt. R. E. YOUNG, R.C.A.F., No. 432 (R.C.A.F.) Sqn.
Flt. Sgt. J. T. HUFFMAN, R.C.A.F., No. 435 (R.C.A.F.) Sqn.
Flt. Sgt. F. LAZUK, R.C.A.F., No. 424 (R.C.A.F.) Sqn.
Flt. Sgt. F. J. FORBITT, R.A.F., No. 115 Sqn.
Flt. Sgt. T. J. A. RAYMONT, R.A.F.V.R., No. 635 Sqn.
Flt. Sgt. (now P/O.) G. M. TULK, R.C.A.F., No. 625 Sqn.

Roll of Honour

Casualty Communiqué No. 530.

THE Air Ministry regrets to announce the following casualties on various dates. The next of kin have been informed. Casualties "in action" are due to flying operations against the enemy; "on active service" includes ground casualties due to enemy action, non-operational flying casualties, fatal accidents and natural deaths.

Of the names in this list 162 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—F/O. J. R. Brockbank; F/O. J. A. C. Chapman; Sgt. A. C. Davy; W/O. J. S. Ely; Sgt. S. Shaw; Flt. Sgt. W. J. Sparkes.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. D. V. Blaikie; Sgt. R. S. F. Horn; Sgt. R. E. G. Parnaby; Sgt. F. H. Shorter; F/O. D. I. N. G. Sinclair; Sgt. H. T. Varcoe.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Lt. B. W. Andrew; Sgt. A. A. Ansell; Sgt. J. Atkinson; Sgt. J. Baldwin; Sgt. J. D. Barber; Sgt. K. V. Barnes; F/O. K. Bateman; Sgt. A. A. Beale; Sgt. D. Blackie; Sgt. L. H. Boxier; Sgt. R. W. Brett; Flt. Lt. P. K. Burley, D.F.C.; Flt. Lt. A. R. Cadman, D.F.M.; F/O. T. S. Calder; Sgt. W. J. Cheshire; Flt. Lt. J. G. Cooke; Flt. Sgt. R. V. Cooling; Sgt. F. W. Cousins; Sgt. R. F. Crowe; F/O. E. J. Currie; F/O. I. R. M. Douglas-Pulleyne; Sgt. D. W. Drummond; F/O. C. S. Duncan; P/O. R. Dutton; Sgt. W. Dutton; F/O. F. J. Dyer; F/O. G. J. Elliott; F/O. C. J. Ennis, D.F.C.; Sgt. I. Feldman; Sgt. W. J. Follows; P/O. P. H. French; Sgt. T. F. Frogley; F/O. F. Griffiths, D.F.C.; Sgt. J. P. Guy; Sgt. G. E. D. Hands; F/O. A. W. Hillyer; Flt. Sgt. C. R. Hitchcock; Sgt. W. I. Howitt; Sgt. H. W. Hughes; Sgt. J. R. Ireland; Flt. Sgt. R. E. Jones; Sgn. Ldr. G. F. Lambert, D.F.C.; Sgt. R. M. Lane; Flt. Lt. H. A. Lightbody; Sgt. S. W. Ling; Flt. Lt. A. S. McFadden; Sgt. R. Marshall; Flt. Lt. C. V. Mason; Sgt. P. E. Mitchell; Sgt. J. W. Randall; Flt. Sgt. R. G. Rivers; Flt. Lt. F. D. Round, D.F.M.; Flt. Lt. D. H. Rowlands, D.F.C.; Flt. Sgt. M. W. B. Steele; Flt. Sgt. D. F. Stunt; Flt. Lt. E. A. Taylor; Sgt. M. J. Tayler; Sgt. F. A. G. Thomas; Sgt. R. Thompson; Flt. Lt. R. D. Trevor-Roper, D.F.C., D.F.M.; Flt. Sgt. K. J. Turley; Flt. Sgt. G. W. Wheeler; Sgt. J. R. Williams; Flt. Sgt. J. R. Wood; Flt. Sgt. J. L. Wright; P/O. S. P. Wright.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW REPORTED KILLED IN ACTION.—Flt. Sgt. J. Darlington.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—F/O. M. P. Frobisher; F/O. R. F. Hudson.

WOUNDED OR INJURED IN ACTION.—Flt. Sgt. A. E. Camlin.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—F/O. W. S. Parker, D.F.C.

MISSING, BELIEVED KILLED IN ACTION.—F/O. J. M. Hartman; W/O. I. R. H. Iago; F/O. I. J. MacGregor.

MISSING.—Sgt. W. Bean; Flt. Lt. D. Belot; Sgt. J. T. Breeze; Flt. Sgt. H. H. Briggs; Sgt. R. S. Brown; Flt. Sgt. E. J. Budd; Sgt. W. L. Burbridge; Sgt. C. F. P. Burridge; Sgt. H. Burrows; Sgt. A. S. Burt; Flt. Sgt. D. W. Clark; Sgt. W. L. Clark; F/O. R. Coburn; Sgt. T. Cooney; Sgt. J. Corbett; Flt. Sgt. P. Cotton; Flt Lt. W. T. Cox; F/O. J. Crawford; Flt. Sgt. C. Daintith; Sgt. A. T. Dixon; Sgt. W. Drysdale; Sgt. W. H. Edge; Sgt. F. G. Edwards; Wing Cdr. H. W. Eliot, D.S.O., D.F.C.; F/O. F. W. Elliott; Sgt. P. J. F. Escott; Sgt. K. J. Etherington; Flt. Sgt. S. F. Giles; Flt. Sgt. F. W. Grant; P/O. J. A. Green; F/O. P. I. Green; Flt. Sgt. F. C. Gubbins; Sgt. W. Haile; Sgt. E. Haines; Flt. Sgt. F. H. J. Harris; Sgt. R. E. Hayward; Sgn. Ldr. M. R. Hill; F/O. R. C. Hill; F/O. E. F. Hook; P/O. P. Hunt; F/O. J. A. Hurley; Flt. Sgt. C. G. Jarman; W/O. P. M. A. Johnston; Sgt. J. E. Kitchen; Flt. Sgt. T. F. Kyle; Flt. Lt. G. E. McBride; P/O. E. J. F. McCarthy; Flt. Lt. R. D. MacKenzie; Sgt. J. P. Maguire; Flt. Sgt. A. Matthews; Flt. Sgt. F. E. Mayer; Sgt. J. F. A. Moonev; Sgt. D. Morris; F/O. G. Morris; Flt. Sgt. G. P. Morris; Sgt. A. J. E. Morton; Flt. Sgt. J. Newby; Sgt. D. Nicholl; Flt. Lt. M. R. Norem; Wing Cdr. V. R. Oats; Flt Sgt. F. W. Peace; Sgt. H. Peach; P/O. W. G. Pearce; Sgt. W. M. Phillpotts; Sgt. H. R. Piper; F/O. G. Pond; F/O. P. Radford; W/O. A. F. Richardson-Jones; Sgt. A. Robinson; Sgt. H. D. Rutt; Sgt. W. Seeckts; Sgt. L. H. Shairl-Gosling; F/O. L. G. Sleven; Sgt. J. T. Smith; Sgt. N. E. Smith; W/O. B. E. D. Snowden; Flt. Sgt. R. E. C. Spall; Flt. Lt. W. G. Steele; Sgt. E. M. Stoves; Sgt. W. Summers; Flt. Lt. F. G. Sutton; Flt. Sgt. G. L. V. Tabor; F/O. B. F. Tallerman; F/O. G. L. Taylor; Flt. Sgt. R. Taylor; Sgt. E. C. M. Trott; Sgt. E. J. Turner; Wing Cdr. G. Watson, D.F.M.; Flt. Sgt. S. W. Wentworth; Sgt. K. E. White; Flt. Sgt. J. A. Wright; Sgt. J. Young.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—Sgt. F. Gill.

KILLED ON ACTIVE SERVICE.—Flt. Lt. B. C. Brooker, D.F.C.; Sgt. J. A. Buchanan; W/O. R. W. Crack; F/O. L. W. Creasley; Flt. Lt. A. C. Diemer; L.A/C. E. Handley; Sgt. J. W. Hagen; Flt. Sgt. D. W. Kidd; Flt. Sgt. E. C. P. Langley; Flt. Sgt. A. E. Leach; W/O. L. Lisner; Flt. Lt. K. Lock, Flt. Lt. R. Martin; Flt. Sgt. A. J. Nunn; W/O. S. Oklfield; F/O. A. K. McG. Paton; F/O. K. L. Pile; Flt. Lt. J. Robertson, D.F.M.; F/O. C. A. Robson; Flt. Lt. A. MacK. Stewart; Flt. Sgt. R. B. Stewart.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. A. A. Marrow; Sgt. R. H. Towns.

WOUNDED OR INJURED ON ACTIVE SERVICE.—L.A/C. G. Armitage; Cpl. J. W. White.

DIED ON ACTIVE SERVICE.—Flt. Sgt. A. W. Arundel; Flt. Sgt. J. Barbour; L.A/C. G. H. B. Grimwood; L.A/C. J. Wicks; Cpl. L. Woodford.

Royal Australian Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. P. T. Cameron; P/O. E. T. Lynch; P/O. W. R. H. Moulden.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—P/O. A. J. Collins; W/O. G. E. Doggett; Flt. Sgt. R. T. Gill; F/O. L. A. Gream; F/O. O. L. I. Howard; Flt. Sgt. G. A. Johnston; F/O. W. H. Lees; Flt. Sgt. D. R. Molan; W/O. N. A. Royal; F/O. J. H. Smith; Flt. Sgt. R. S. Smith; P/O. M. D. Watson.

MISSING.—F/O. I. S. Baudinette; Flt. Sgt. T. T. Clarke; F/O. C. Dealey; Sqn. Ldr. J. C. Holmes; F/O. D. G. Hudspeth; Flt. Sgt. A. E. London; W/O. E. O. T. Mayne; Flt. Lt. T. E. V. Morgan, D.F.M.; Flt. Sgt. H. J. Porter; Flt. Lt. B. M. Williams; W/O. A. E. Wood.

Royal Canadian Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—F/O. B. W. Clarke; F/O. C. B. Cohen; F/O. J. W. H. Conway; P/O. H. J. Kennedy; Flt. Sgt. I. D. MacVicar, F/O. E. J. Mann; P/O. T. B. Owen; P/O. R. W Robinson.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—F/O. J. K. Armstrong; F/O. R. H. Bannnihr; P/O. H. J. Barrons; P/O. J. A. Bergeron; W/O. J. D. Blane; P/O. P. H. Brittain; Flt. Lt. R. R. Burgess; P/O. R. G. Carter; P/O. E. A. W. Dawson; P/O. P. R. Eagles; P/O. T. H. Elliott; P/O. W. Fernyhough; P/O. T. MacK. Hamilton; F/O. G. J. Huddart; Flt. Sgt. A. J. Jackson; P/O. K. A. Jeffery; P/O. G. C. Krahn; P/O. G. A. Lewis; Sgt. J. A. Logan; W/O. L. A. R. Lowe; F/O. M. J. McDonald; P/O. R. McEwan; F/O. A. E. May; Flt. Sgt. P. L. Mitchell; F/O. J. H. Morrison; Sgt. H. J. Mouland; P/O. J. V. Musser; F/O. T. Negrich; F/O. M. R. Oliver; F/O. J. F. Potter; P/O. J. R. Power; P/O. K. E. Rhodes; P/O. C. N. Samson; P/O. D. K. Schroder; P/O. D. L. Sehlin; P/O. J. E. Shuster; F/O. J. A. Spearin; Flt. Sgt. M. H. Stoner; P/O. S. J. Swartz; P/O. A. E. C. Thomas; P/O. E. G. Todd; F/O. R. G. Viau.

MISSING.—F/O. A. J. Beck; W/O. A. F. Dales; F/O. H. R. Dart; W/O. J. A. Dickson; Sgt. W. S. Dickson; Flt. Sgt. W. J. Doherty; F/O. M. N. Firth; Flt. Sgt. O. Harding; Flt. Lt. D. W. Hill; P/O. L. E. Hoffman; Flt. Sgt. R. E. Kearney; P/O. J. W. Kopp; Flt. Lt. C. H. Living; Flt. Sgt. K. C. McKeown; F/O. W. P. Maloney; Flt. Sgt. H. A. Neal; W/O. F. E Newman; Flt. Sgt. F. H. Paterson; F/O. W. N. Patterson; F/O. C. J. P. Ramsey; F/O. J. A. Russell; F/O. G. H. P. Shephard; Flt. Sgt. R. J. Simpson; F/O. S. A. Tader; P/O. B. S. Thompson.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—F/O. R. W. Murray; P/O. H. E. Simmons.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. G. E. J. Gardner; Flt. Sgt. E. G. Houghton.

MISSING.—F/O. K. Jackson; F/O. E. P. Smith.

South African Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Lt. R. E. Chaplin; Flt. Sgt. P. J. Joubery; Lt. G. P. Kriel; W/O. W. J. Layed; Sgt. R. W. Martin; 2nd Lt. H. Rowson.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Lt. B. D. Classen; 2nd Lt. C. J. B. Haggett; Flt. Sgt. I. E. Humpries; 2nd Lt. R. E. Ireston; 2nd Lt. A. E. Lallyett; Lt. A. M. Milbee; Lt. D. Smith; Lt. E. J. Thornhill-Cook; Flt. Sgt. E. Viveros; Lt. L. C. Wessels.

MISSING, BELIEVED KILLED IN ACTION.—2nd Lt. J. C. Prott.

MISSING.—D. K. Austin; W/O. H. T. Benn; W/O. R. J. Faull; Lt. A. I. G. Holmer; Lt. P. A. Klapper; Lt. W. S. Parker; 2nd Lt. M. F. Reim; Lt. T. A. T. Steele; W/O. S. R. E. Wicht.

KILLED ON ACTIVE SERVICE.—Lt. M. F. T. Mainwaring; Air Mech. H. T. Ware.

OFFICIAL CORRECTION.

Casualty Communiqué No. 501.

It is regretted that F/O. H. Ross was erroneously shown as MISSING. His name should have appeared under the heading KILLED IN ACTION.